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CACTUS AND SUCCULENT JOURNAL

Vol. XXIX MAY-JUNE, 1957 No. 3

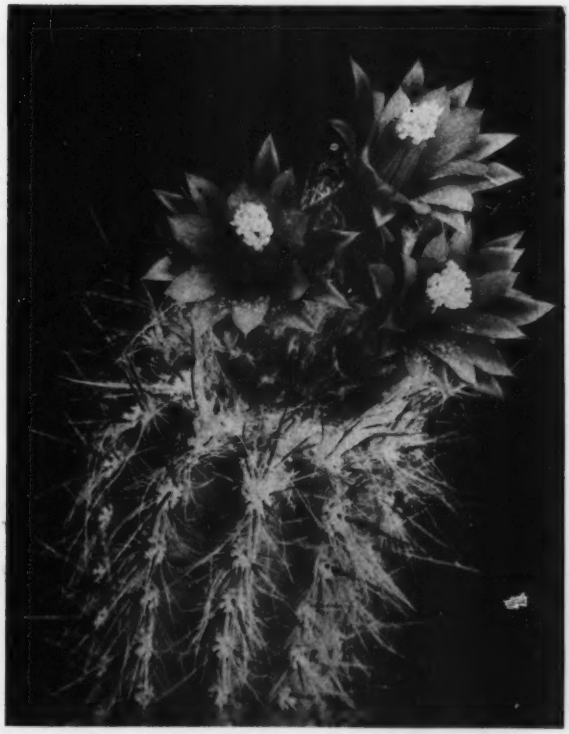

FIG. 37. *Oreocereus doelzianus* flowering in Marjorie Shield's glasshouse in New Zealand.

CACTUS AND SUCCULENT JOURNAL

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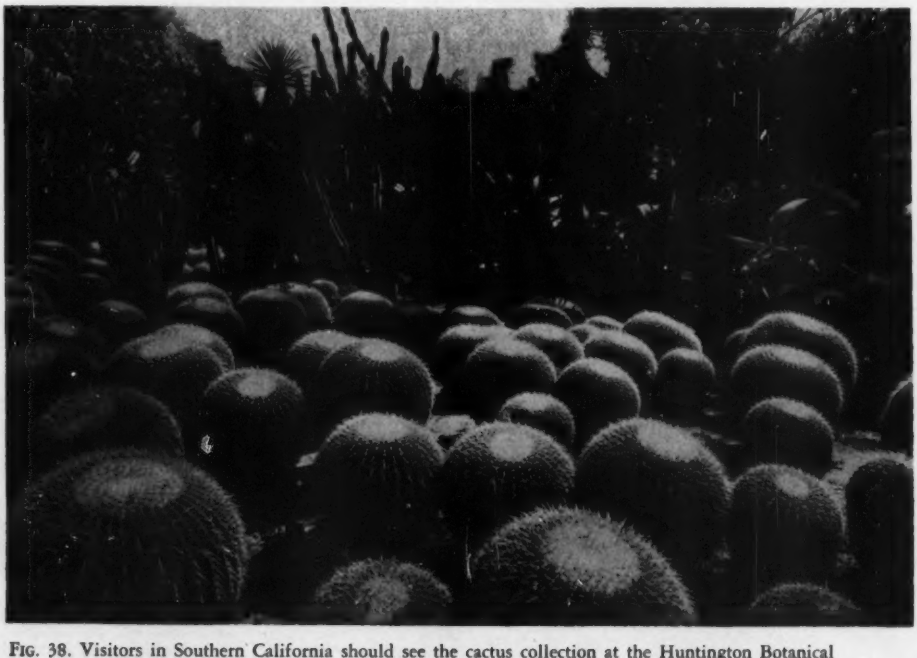

FIG. 38. Visitors in Southern California should see the cactus collection at the Huntington Botanical Gardens. The above photo by Martin's Studios, Pasadena, shows a group of Golden Barrels *(Echinocactus grusonii)*.

DESERT FLOWERS UNDER GLASS

The story of my experiences and delight in growing and flowering Cacti and Succulents in a small glasshouse in Christchurch, New Zealand

By MARJORIE E. SHIELDS

CHAPTER 3

Here are some amazing looking plants that should appeal to you. They are Oreocerei. Look! There are flowers on *O. doelzianus!* Aren't they a wonderful colour! I have been watching those buds for the last two or three weeks pushing themselves up amongst the pinky brown and white wool, and now that they have burst into bloom, there are three bright reddish-purple flowers standing on top of the plant, surrounded by a thick hairy cephalium. The flower is tubular, the tube being formed of small petal-like scales which gradually develop into true petals as they reach the end of the tube. The tube itself is thick and hairy, about 2 inches long, and including the petals the flower stands at least 3 inches above the top of the plant. The outer petals are dark red, the inner ones crimson, with crimson filaments in a tight bunch, capped with biscuit-coloured anthers. These surround the greenish stigma lobes in the form of a ball on top of a pale pink style. Aren't they a gorgeous piece of colouring, standing there surrounded by all that white woolly-like hair intermingling with the bright golden brown spines? The plant itself is colourful; it is tall, thinnish, and branched from the base, and very generously bedecked with wool, hair, and spines. The first flowers appear in October (late spring) and are followed by periodical bloomings throughout the summer and autumn.

O. trollii should be the next to flower, as it is a grafted plant growing very strongly. It is completely covered with long, soft, woolly hair, the green of the body scarcely showing through. The fearsome looking cinnamon brown central spines which are 2 inches long show up beautifully amongst the long, white, unruly hair. *O. celsianus* is also a grand plant, with hair almost as long as O. trollii's, but is a little coarser and not as thick. You *can* see the body of this plant and the very large areoles thickly felted with golden plush. The spines are not as long nor are they as brilliantly coloured as O. trollii's. All the same it is a most attractive plant. *O. fossulatus* will have to grow considerably before it can compete with the other three. As Oreocereus means "Mountain Cereus", we naturally expect to find them growing on the mountains, and we should look for them on the Andes in Peru, Bolivia and as far south as Chili. *O. doelzianus* is sometimes called *Morawetzia doelziana;* it was so named by Backeberg after V. Morawetz, but it is still quite correct to call it an Oreocereus. These plants like plenty of sun and fresh air; a well drained soil containing plenty of sand, stones, lime and humus. They like to be cool and kept dry during winter. I have found neither scale or mealie bugs on them.

While I have been talking I have noticed your eyes being drawn to the Echinofossulocacti group. And no wonder, for they are a picture just now. These little multi-ribbed cacti from Mexico, open up the spring parade of cactus flowers with a flutter of pink and white striped petticoats. Don't they look gay? Just as though they are enjoying life thoroughly and want us to share their joy with them. I love their fresh daintiness too. You may call them "Stenocactus," and you would be quite correct, but that name is not nearly as descriptive as Echino-fossulo-cactus is it? These plants with their many fine ribs look like fossils, only in green instead of white. I look on them as the crocuses of the cactus kingdom, because, except for a few stray Mammillaria flowers, they are the first to bloom in the spring. We always watch for them in September. Now to look at them individually.

E. multicostatus, meaning "many ribbed" is usually the first to don its pretty petticoat. The flowers, in company with the majority of blooms on these plants, are white, with a purple mid-rib to each petal, and as there are so many of them it gives the blossoms the appearance of being striped. If you look right down into its heart you will see the filaments are pale pink and the anthers and stigma lobes, yellow. *E. zacatecasensis* has a deeper purple stripe and purple filaments, while the stigma lobes and anthers are biscuit-coloured. It would not take much imagination to think that these petals have a tinge of purple in them too. *E. lancifer* is much paler in colour, with a pinky mauve stripe and pale pink stigma lobes. The name means "lance bearing" and refers to the lance-like spines. *E. lamellosus* is delicately flushed with pink, with a pale maroon stripe, cream stamens and stigma lobes. This name means "having thin plates or scales," but I cannot find either on my plant, unless the fine ribs are likened to the thin plates in a car battery! *E. hastatus* seems to be having great difficulty pushing its flowers up between those very strong perpendicular "spear-like spines" which is what "hastatus" means. It is amazing the strength there must be in those dainty petals.

FIG. 39. (Left) *Oreocereus celsianus* 1 ft. 8 in. high. (Right) *O. trollii* 1 ft. high

This flower is a little whiter than the others and the mid rib is pink.

Here is a surprise. *E. albatus* with a yellow flower! All yellow, including both the stigma lobes and the stamens; and the blooms are much smaller than any of the others. All the same isn't it beautiful? The pink and white flowers of the rest of this group would not have looked nearly as attractive on this plant, because the central spines are so yellow and the radials and the wool so white; it needed those yellow flowers to complete a perfect specimen. But why is it called "albatus," which means "clothed in white," when it has yellow flowers? Could there be a mistake somewhere and it is not *E. albatus* at all? What do the Authorities have to say about it I wonder? Ah, yes! I thought so, the flowers should be white. It looks as though the bees perhaps, have been having a game. However it is very lovely even though it is not true to the name given it in 1846.

The shape of the flowers on *E. acroacanthus,* meaning "spiney tipped" is a little different from the others. The petals are wide and come to a blunt point, so that the flowers look as though they have been cut out with a pair of giant pinking shears. Look into the glowing purply red heart of it. Isn't it lovely? The mid rib and the stamens match its heart. The petals of *E. crispatus* look as though the mid ribs were marked in with indelible pencil before they were properly dry and the colour has run! It is most effective. The name means "curled" and refers to the wavy ribs. Here are two with much brighter colouring.

E. heteracanthus "with different spines," is more beautiful still, with similar colouring only in a very much lighter shade. It has three rows of petals instead of the usual one, making this a very full flower. I think it is the gem of a most attractive group. Also the spines are different as its name says, being much finer than is usual on these plants. A very good point in favour of this group is that mealie bugs prefer other plants, which is just as well as they would be very hard to eradicate with the ribs so close together.

Here on their small grandstand is a group in complete contrast to the last. Whereas they had many, many ribs, these have very few, usually five (they can have more or less), so they are called Astrophytums or "Star Cacti". All are found in Mexico and there are four species only, with many varieties, namely:

A. ornatum, meaning adorned, ornate.

A. myriostigma, meaning with numerous marks or punctures.

A. capricorne, meaning having horns like a goat.

A. asterias, meaning like a star.

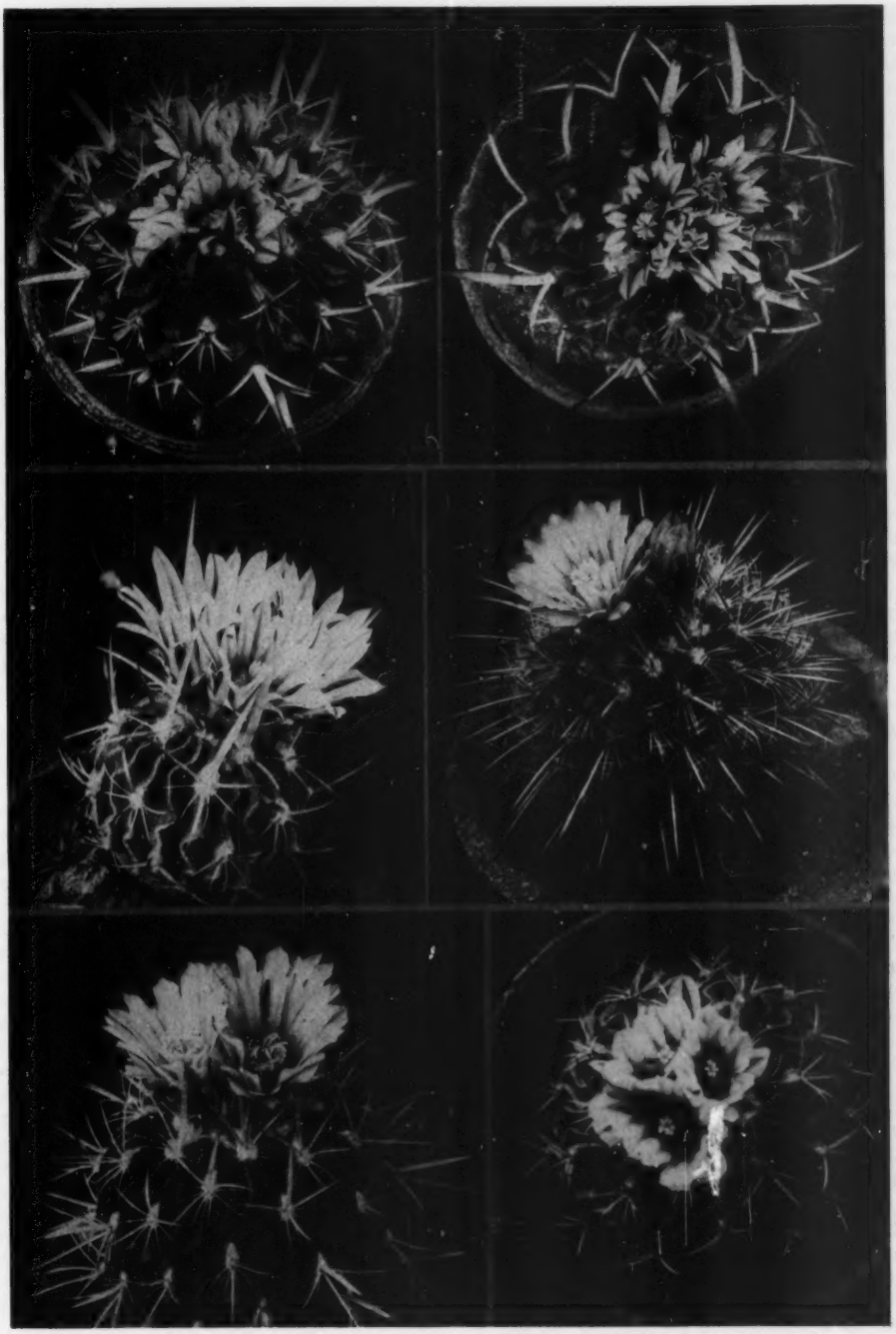

FIG. 40. (Top) *Echinofossulocactus multicostatus, E. zacatacasensis.* (Center) *E. hastatus, E. heteracanthus.* (Bottom) *E. crispatus, E. acrocanthus.*

How descriptive these meanings are, and how suitable in each case. Look at *A. ornatum* on the top of the stand, adorned and garlanded with bands of white clustered scales, draped from rib to rib like silver tinsel looped from branch to branch on a Christmas tree. And the beautiful golden spines, so straight and grand in such large clusters are certainly ornate. Then *A. myriostigma* so thickly covered with clusters of minute scales, the body is completely clothed. And there are no spines at all! Then *A. capricorne* with its horns like a goat, twisting and curling this way and that; broad, flat, and tapering, and the body covered with much larger clusters of cream scales than in the *A. myriostigma* group. Lastly *A. asterias*—like a star. I wonder if the originators of the name had ever seen a sea-egg or a sea-urchin? Perhaps then the name would not have been "asterias".. All the same the wide flat ribs form a perfect star when viewed from above. Unfortunately my plant is not yet large enough to place in the group. It is still in the nursery, growing nicely and will be here eventually.

So you have discovered the odd one? Yes, it is a hybrid, with the *A. myriostigma* body—spotted all over—or, as they are such large spots maybe it is A. capricorne's body and A. ornatum's spines. I will know when it flowers, if the latter, the throat will be red. I was told it had a gorgeous bloom. The plant is very white and the spines golden yellow. A most attractive plant even without flowers.

We must wait until October—late spring for the blossoms. Then *A. ornatum* will have large yellow flowers, which are just as pretty on the outside as they are on the inside, for on the outside of the tube are short black scales, like tiny pieces of fluttering ribbons. Some of the back petals are tipped with black also and look very striking against the yellow. This year it had a cluster of six flowers all out at once, it was a very beautiful picture.

Then there is var. *auriespina,* very like *A. ornatum,* except that everything about it is on a smaller scale. The little tufts of scales are smaller and in narrower bands; the areoles are not as large, and the spines which are less numerous, much finer and not nearly as long; even the flower is smaller. Another dissimilarity is in the greater number of ribbon scales, which are golden brown and narrower. So although this is a beautiful plant it does not come up to *A. ornatum* for grandeur.

Now let us look at the *A. myriostigma* group and see wherein they differ from the "ornatums". The flowers on the whole are much smaller and open out wider and flatter; and the plants look as though they have been tightly tied into segments with a cord, and look so cute as each one is wearing a yellow sunflower hat. They are quaintly pretty but have not the grandeur of the "ornatums". *A. myriostigma* itself has the largest flower, it is really beautiful, pale yellow with orange stamens and cream stigma lobes and with black ribbon scales on its flower tube. Variety *nuda* is a green plant, quite nude, with no white spots or markings of any kind. It looks most conspicuous amongst the other well spotted plants. It has an adorable flower, much fuller than the others, there being a double row of petals. Var. *quadricostata* as its name tells us is divided equally into four divisions, and is the one known familiarly as the Bishop's Cap. The little yellow flower looks so neat sitting in the centre of the very plump body. Var. *potosina* has a pale yellow bloom, looking almost silvery, it is so pale. All the Myriostigmas have yellow stigma lobes and loosely arranged stamens to match.

But what a lovely flower *A. capricorne* has. Yellow of course, like all Astrophytums, but with a red throat. And the red filaments topped with yellow anthers, look like tiny golden stars suspended above a glorious sea of red. Hold it up to the sun and see how the red from the throat shines through the tube, and how the black ribbon scales show up to make it more beautiful! When I first saw this flower I could not help a gasp of wonderment, and even now, though I have seen it so often, I still have to pick it up and hold it to the sun to see the red glowing through. It is still wonderful to me.

Astrophytums make perfect hosts for mealie bugs. They use them for their winter quarters; it is so smug under those bulging, fat sides, which make wonderful hiding places for them. They will burrow under a fold, even puncturing the skin to get in closer, thus causing the loss of a plant when watering commences again in the spring. Hold the plant upside down and examine it thoroughly underneath to make sure none of these pests are lurking there. Otherwise these plants are easy to manage. Coming from Mexico they revel in hot sunshine, so place them in one of the hottest positions in the glasshouse and they will grow and blossom to perfection. Keep perfectly dry in winter. I forgot to tell you that they will continue to flower throughout the summer and autumn, until the cooler weather retards the still forming buds, which will sometimes remain on the plants until stirred into life once more the following spring. They are amongst the most satisfying plants to have in a collection.

Now the Dyckias are attracting your attention. Interesting plants aren't they? They belong to the pineapple or Bromeliad family. The plant form is rather like a pineapple top isn't it? They are found in South America where it is hot and

FIG. 41. (Top) *Astrophytum myriostigma, A. ornatum.* (Bottom) *A. quadricostata, A. capricorne*

dry, therefore they have developed tough, leathery leaves, armed along both edges with sharp hooked teeth which make the plants very difficult and painful to handle. They were named after Prince von Salm-dyck. *D sulphurea* has a tall stem of sulphur yellow three petalled flowers, the petals folding round each other to form a small tube. The stem of *D. rariflora* reaches 26 inches before the first flower appears. Such gay little flowers too, in tangerine. To my mind it has more appeal than *D. sulphura,* but on the other hand the latter has the better foliage and

also has a striking looking seed head which looks well in a dried arrangement.*

The two Hechtias are from Texas, and have larger, more spectacular rosettes than the Dyckias. *H. texensis* has a green rosette, the upper surface of the leaves being flushed with dull red and the under surface whitened with many fine white lines. But what an uninspiring flower it has! The 12 inch long stem has clusters of buds spaced at intervals up it. These buds open up one or two at a time, the actual flower being very small, white and three petalled, like most Bromeliads. The clusters will eventually elongate slightly as fresh flowers are ready to unfold. *H. rubri-viride* is very lovely, with leaves bright red on top and snow white underneath. This one has yet to flower, and November, early summer, will be the time to watch for it.

Another member of the Bromeliad family is *Aechmea recurvata,* and it has produced the queerest flowers. The plant has fine flax-like leaves with serrated edges as sharp as a fine saw in the form of a rosette. These rosettes have clustered and in the centre of each a flower head has appeared. How can I describe them? Perhaps I could liken them to a cone, or better still, a husk, and from out of each little bract which forms the husk, a gay, tiny, bright mauve flower has appeared. But that is not all. Each rosette, being so pleased with its effort has turned a beautiful scarlet. Can you imagine it? These lovely scarlet rosettes surrounding the husk of bright purple flowers! It is most exotic.

Have I missed some? Oh! the little Frailias! I am so sorry. They are so small and insignificant looking we bypassed them. But here they are at

*See page 70, Succulents for the Amateur for picture of the plant.

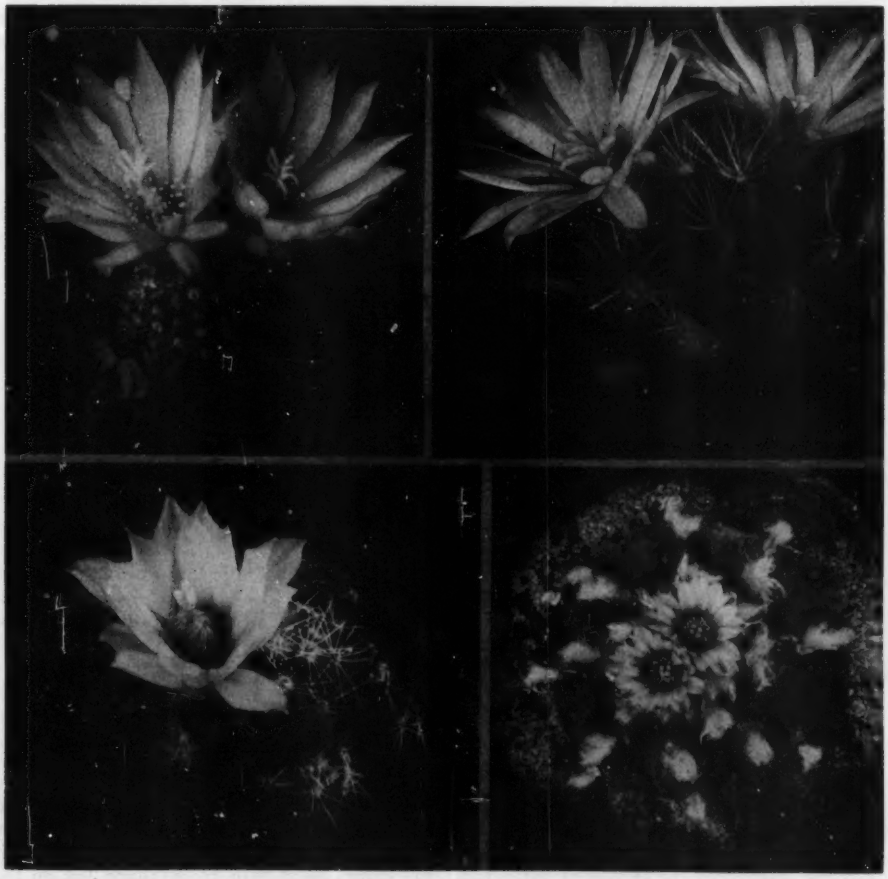

FIG. 42. (Top) *Frailea grahliana, Dolichothele longimamma.* (Bottom) *D. sphaerica, Lophophora williamsii*

the feet of the Oreocerei, three of them. And most interesting little plants they are too, even though so small, for it is not very often they delight us with their lovely blossoms, but always there are plenty of seed pods! Last January (late summer) there were twin blossoms on *E. grahliana.* I have had this plant for several years and have collected seed from it each year but never before has a flower opened. Buds have formed without even a suspicion of the petals showing. I had no idea what colour the flower was. This plant is really very wonderful being able to set seed without the flowers opening at all. It is a miniature cactus, one of the smallest I believe and its two lovely yellow flowers were a great joy. The tube is covered with white and brown hair and wool; the long narrow petals are sharply pointed with feathered edges, the back petals being tipped with bronze. The heart of the flower is red, with loosely arranged stamens and the stigma lobes stand well above them. This arrangement is very peculiar considering the flower is self-fertilising. I should have thought it would have been the other way about. Perhaps it is like the violet which also can set seed without opening its petals. In the violet, the stigma only grows longer than the stamens when the flower is going to open; otherwise it remains short and below the stamens and so is self fertilising. That would explain the mystery. When a flower actually opens it relies on the bees to fertilise it. Just one more example of how wonderful nature can be. Beside *F. grahliana* is *F. pygmaea;* this one also had two buds, with the yellow petals ready to unfurl. After weeks of hot sunshine the weather broke, turned cold, and down came some very welcome rain. That was too much for *F. pygmaea,* which glories in the heat and brilliant sunshine. One cold day would not have hurt it, but two, were just too much, and instead of opening its petals, they withered. So I did not see *F. pygmaea* after all. The third one is *F. pumila,* this also has yet to flower. Pygmaea means "very small," and pumila "dwarf." Fraileas come from South America, *F. grahliana* from Paraguay, *F. pygmaea* from Uruguay and Argentina, and *F. pumila* from Paraguay and Argentina. The name Frailea does not mean that the plants are frail, the genus was named after Manuel Fraile of Washington.

In front of the Bromeliads is a small group of mixed plants, a Leuchtenbergia, a Lophophora, an Arequipa and two Dolichotheles.

The Mexican plant, *Leuchtenbergia principis* is the only one in its family and was called after the Duke of Leuchtenberg. It is such a queer

FIG. 43. (Left) *Dyckia rariflora.* (Right) *Aechmea recurvata*

looking plant with long, angled, finger-like tubercules, each one, with what looks like a bunch of dried grass growing from its tip. It will be a great day when mine flowers.

We must go to Mexico and Texas to seek *Lophophora williamsii* growing in its natural habitat. A fat, squat, quaint little cactus, with tufts of wool at each spineless areole which stands up like a crest or a cowlick. Lophophora means "a crest" so the plant is well named. See how the wee pink blooms sit so comfortably on their soft woolly seat in the centre of the over-stuffed green-gray pin cushion, minus the pins of course, because this little gem of a cactus has no spines whatever. The blossoms are clear pale pink, with a bunch of yellow stamens. The first blooms appear in the late spring, October, and blossoms follow blossoms right through the summer until the cooler weather of autumn checks it.

Arequipa leucotricha comes from South America and was named in honour of the city of Arequipa, Peru. It has not yet flowered for me. *Dolichothele longimamma* meaning "long nipple or tubercule" has a beautiful large yellow flower, with stigma lobes and stamens to match, but *D. sphaerica,* with an equally beautiful yellow flower has wider petals, which come to a sharp point ending in a fine hair. The back petals have a dull pink mid rib and this colour also shows in the throat of the flower. The golden yellow stamens swirl and curl round the style in a most fascinating way. The small pale yellow stigma lobes stand well above the plant. These plants come from Mexico and Texas.

Next month we will meet the Coryphanthas, Cleistocacti, and Stapeliads.

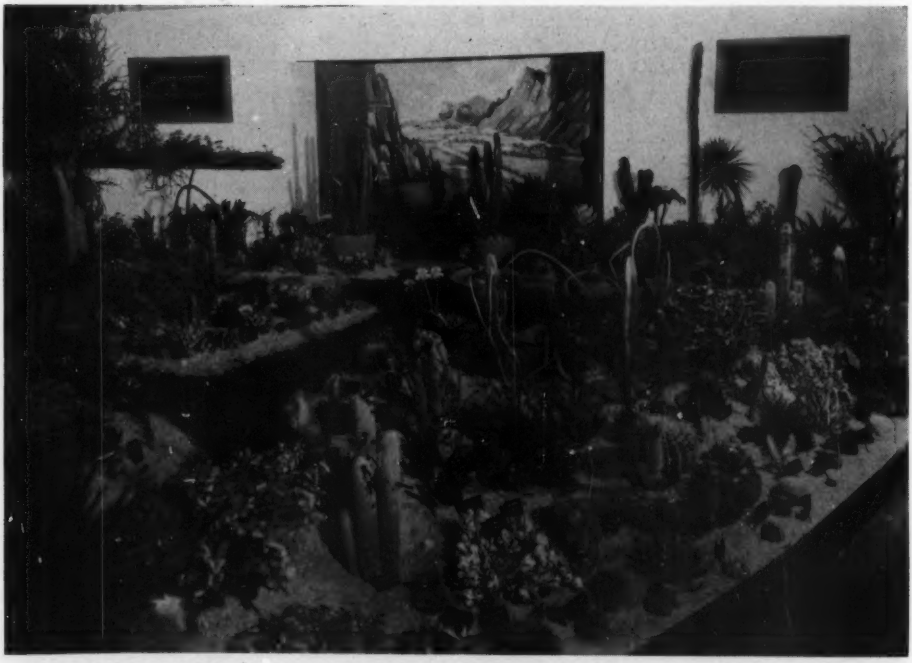

FIG. 44. F. I. Carter and Sons of Tewksbury, Massachusetts is usually a sweepstakes winner at the Massachusettes Horticultural Show in Boston. The above photo shows one of their winning exhibits.

ICONES PLANTARUM SUCCULENTARUM

9. *Disocactus eichlamii* (Weingart) Britton et Rose[1]

By MYRON KIMNACH AND P. C. HUTCHISON

When W. Weingart[2] described *Phyllocactus eichlamii* in 1911 he also related its early history:

"In Guatemala some years ago Herr Eichlam found in the crown of a tree a very dainty *Phyllocactus* about 1 meter in diameter whose leaf-like branches covered its woody support like a roof and were loaded with unripe, pea-sized fruits. Some still bore an obviously red perianth. The cuttings taken soon rooted, grew three-angled and terete branches, and the fruit also matured. These were at least as large as a pea, white and translucent, and strikingly similar to the berries of *Viscum album* [the common European mistletoe] or *Rhipsalis cassutha,* which is very common locally.

"At first Herr Eichlam believed it to be a new *Rhipsalis* species similar to *R. alata* Schum. [*Pseudorhipsalis alata* (Swartz) Britt. & Rose]. When the cuttings produced rigid, erect shoots he believed the plant to be identical with *Phyllocactus biformis* Labour. [*Disocactus biformis* (Lindl.) Lindl.], especially as on a later visit to the same locality he observed that the original plant, besides having white berries, also bore red ones on those portions less exposed to the sun. But finally the cuttings produced numerous flowers which showed this to be a new species."

Weingart stated that it "grows epiphytically near Sa. Lucia C. and is widespread in the coffee zone of Guatemala, thus in a moist warm climate." He did not mention in what year Eichlam found his plant, but according to Krainz[3] this was in 1905. The species was first discovered by Heyde and Lux, who in May, 1892, collected it near Santa Rosa in the Department of Santa Rosa. A sheet of this collection in the U. S. National Herbarium is annotated *Phyllocactus biformis* by K. Schumann, but the broad crenate stems, and the flowers with long-exserted stamens are those of *D. eichlamii.* No other localities are recorded.

In 1910 Eichlam sent a plant to Britton and Rose, who, at the time of their transfer[4] of the species to *Disocactus* Lindl., published a photo of it in bloom, which they reprinted in their monograph[5] with the remark that it was "a photograph of the type plant in flower." Material from this specimen is now preserved in the U. S. National Herbarium on two sheets, neither of which is annotated as being type material. Weingart did not designate a type and had made his description from a photograph and notes sent by Eichlam. For the present it therefore seems advisable to designate a specimen of the Eichlam material prepared by Britton and Rose as a neotype (cf. specimens cited below).

Although Britton and Rose stated that their plants flowered in Washington, and the herbarium specimens bear Rose's handwriting, they inadequately described the living flowers. Neither in their generic and specific descriptions nor in their key was the long tubular perianth of this species mentioned, despite the fact that Weingart described this character in detail and used it to distinguish the species from *Disocactus biformis.* Also they remarked that their photo showed "old or half-withered flowers," yet two of these are obviously fresh and of typical shape. They apparently did not realize that the perianth segments in this species never expand.

In publishing a color photograph of this species, Werdermann[6] stated that the plant figured, then being grown at Berlin-Dahlem, came from Weingart, who had received cuttings from Eichlam (presumably after the species was published). According to Krainz *(loc. cit.),* who also gave an excellent photograph of a flowering specimen, all the plants of this species grown in Europe came from Weingart's material. In the United States no field-annotated specimen of this species is in cultivation at present, so far as known. The plant in the University of California Botanical Garden, on which our plate and description are based, was acquired from the Johnson Cactus Garden, Paramount, California, but the original source is unknown.

Disocactus eichlamii (Weing.) Britton & Rose, Contr. U. S. Nat. Herb. 16: 259, 1913.

Phyllocactus eichlamii Weingart, Monatschr. f. Kakteenk. 21 (1): 5, 1911.

Trochilocactus eichlamii Lindinger, Bot. Centralbl. Beih. 61: 383, 1942, *nom. nud.*

Primary stems at first erect to ascending, finally arching-pendent, apically flattened or 3-angled for a distance of up to 25 cm.; terete bases up to 50 cm. long and 4 to 7 mm. in diameter, reddish

[1]University of California Botanical Garden, Berkeley, Contribution Number 146.

[2]Weingart, W., Monatsch. f. Kakteenk. 21 (1): 5, 1911.

[3]Krainz, H., Beitr. z. Sukk. u. -pflege 1939 (1): 11, 1939.

[4]Britton, N. L. and J. N. Rose, Contr. U. S. Nat. Herb. 16: 259, 1913.

[5]Britton, N. L. and J. N. Rose, The Cactaceae 4: 202, fig. 205, 1923.

[6]Werdermann, E., Blühende Kakt. u. and. Sukk. Pflanz., pl. 155, 1939.

or brownish green when young, finally green, the areoles *ca.* 1.5 cm. apart in 4 rows and, near the base, with white bristles up to 4 mm. long; *secondary stems* branching from the apical half of the primaries, mostly from the terete portion and then in four ranks, the bases subterete, up to 1 cm. long and 4 mm. in diameter, flattened apically for a distance of up to 40 cm.; flattened portions of all stems subacute, *ca.* 3 (1.5 to 5) cm. wide, 2 to 4 mm. thick, crenate to nearly obtusely serrate, the lobes oblique, 1 to 3 cm. long, projecting 4 to 7 mm., the leaves at sinus bases, deltoid, 1 mm. wide, at first subtending a few cream hairs and, rarely, a bristle up to 0.5 mm. long, the areoles becoming exserted before flowering, ovoid or with an apical, umbilicate, floral scar, with minute, spiralled bracteoles subtending wool and up to 2 bristles, with exposed, smooth epidermis near the base, up to 2 mm. long, branching laterally before later flowerings, finally forming irregular masses up to 4 mm. in diameter.

Flowers along whole length of flattened stems, most numerous on apical half, emerging from the apex of single or compound, exserted areoles, single at areoles flowering for the first time, later up to 5 together, nearly straight on more erect stems, on hanging stems abruptly upcurved above the pericarpel, narrowly tubular-funnelform, 6 to 8 cm. long, the limb up to 1 cm. wide, the outer tepals slightly expanded, the inner erect with spreading tips; *pericarpel* up to 5 mm. long and 4 mm. wide, in fresh flowers greenish amber below and maroon above, becoming pinker on older or withered flowers, the podaria nearly absent, *ca.* 8, the bracteoles appressed, deltoid to shortly lanceolate, up to 1 mm. long and 0.5 mm. wide, light pink, the lower ones subtending profuse, laterally protruding hairs up to 0.5 mm. long, these cream, sinuous; remainder of *receptacle* up to *ca.* 25 mm. long, *ca.* 3 mm. wide at middle, slightly widening above and below, devoid of podaria, bracteoles, and areoles, the upper half obtusely and inconspicuously ridged by decurrent tepal bases, scarlet-maroon; *outer tepals* 5 or 6, slightly expanding below the middle, then incurved above with tips expanded, linear-lanceolate, *ca.* 25 (35 according to Weingart) mm. long, 1 to 3 mm. wide, scarlet; *inner tepals ca.* 6, elongated oblong-ovate, substrict and erect with tips slightly expanded, 2 to 2.5 cm. long, *ca.* 5 mm. wide, magenta-scarlet; *ovule chamber* turbinate, 1.5 mm. long and 1 mm. wide, the funicles few, unbranched but sometimes coalescent near the base, with numerous long papillae; staminal *nectaries ca.* 7 mm. long, protuberant, yellowish; *stamens*, except for occasional intermediate ones, inserted in two separate zones, the lower inserted 6 to 12 mm. above apex of nectaries, with *ca.* 10 pink filaments 4 cm. long, the upper zone an irregular ring inserted *ca.* 1 cm. above the lower series, with *ca.* 15 pink filaments 3 cm. long, all stamens exserted beyond limb for *ca.* 7 mm.; anthers 1 mm. long and 0.5 mm. wide, cream; *style* 5 to 6 cm. long, 0.5 mm. thick, pink-magenta except for the scarlet apical 1 cm., exserted *ca.* 12 mm. beyond the limb; *stigma lobes* 5, 2 mm. long, half-expanded, papillose on inner face and margins.

Fruit globose with an apical projection, 9 to 14 mm. in diameter, the epidermis smooth and shiny, red (or white according to Weingart), translucent, the podaria very obscure, the bracteoles minute, deltoid, appressed, subtending protruding white wool, the fruit apex prolonged into a neck-like extension 1 mm. long and 2 to 3 mm. wide, somewhat umbilicate at apex, the decurved persistent perianth to 4 cm. long, including dried stamens; pulp odorless, nearly tasteless, very pale pinkish white, evenly filled with seeds; fruit finally drying, persistent, indehiscent.

Seeds subovate with an extremely oblique hilar end, *ca.* 1.25 (1-1.5) mm. long, 0.75 to 1 mm. wide, 0.5 to 0.75 mm. thick at the end opposite the hilum, the testa shiny, nearly smooth but minutely pitted in rows, brownish black (black according to Weingart), unkeeled, the hilum slightly S-curved in profile, elliptical, *ca.* 0.5 mm. long, cream, depressed only at the micropylar end.

Guatemala: Dept. Santa Rosa, Santa Rosa, 1000 m., *Heyde & Lux 3451,* May, 1892 (US 795910); *leg. Eichlam,* exact locality unknown, prepared by Rose from cultivated material at Washington, D.C. (US 68611-Neotype; 68610); collector and locality unknown. *University of California Botanical Garden 51.552* (B, BH, F, G, GH, K, MEXU, S, UC, US).

Although this species has been in cultivation for many years its most interesting character, the proliferous areoles, has never been recorded. On young stems the areoles nearly lack wool, but before flowering for the first time they become very woolly and gradually protrude. Under magnification they are seen to be ovoid projections covered with spiralled rows of minute scales subtending wool, and with exposed areas of smooth epidermis (see 3 of drawing). In spring a single flower emerges from the apex and remains so strongly attached to it that both flower and areole become detached from the stem if the flower is pulled loose (see 4 of drawing). Just before the same areoles flower again the next year the areolar protrusions proliferate laterally, the branches emerging from the scale-axils, and each branch terminates in a flower. All branches of each areolar protrusion are uniflorous, however their proliferation continues for several years until each areole has divided into a prominent

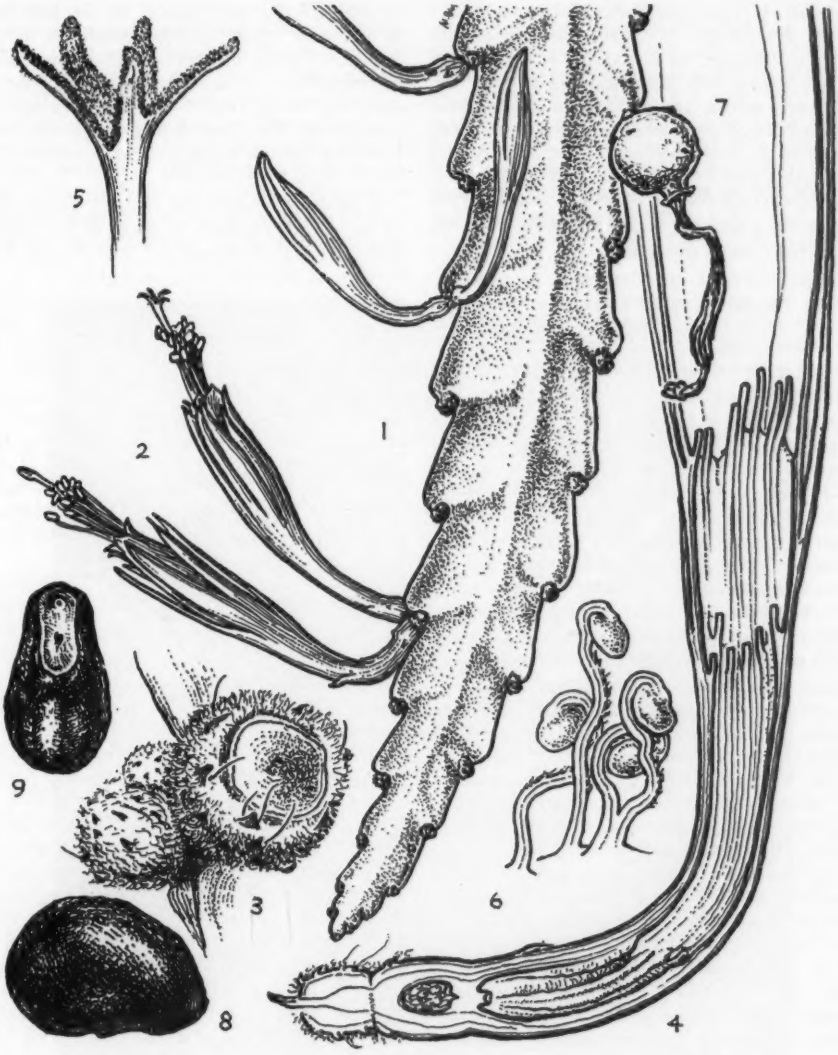

FIG. 45
Disocactus eichlamii (Weing.) Britt. & Rose, U.C.B.G. 51.552. 1, 2. Stem, buds and flowers. 3. Proliferous areole. 4. Stamen insertion. The areole is shown attached to the base of this flower. 5. Stigma lobes. 6. Ovules. 7. Fruit. 8, 9. Seed. 1, 2, 7, nat. size. 3, 6, greatly enlarged. 4, x 4. 5, x 8. 8, 9, x 20. Drawing by M. Blos.

knobby mass from which up to five flowers may appear at once.

An apparently analagous structure in a distantly related genus is found in *Neoraimondia* Britt. & Rose, in which the areoles, elongating over a period of years to a length of three inches, may branch, and repeatedly produce single or geminate flowers. These areoles have not been thoroughly examined, but it is probable that dissection would reveal a solid axis with minute, spiralled scales subtending the wool. Except that the axis does not elongate, a similar condition exists in other cereoid genera with many-flowered areoles, such as *Myrtillocactus* Cons. and *Lophocereus* (Berg.) Britt. & Rose.

We have already referred[7] to many-flowered

[7]Kimnach, M. and P. C. Hutchison, Cact. & Succ. Journ. Amer. 28 (6): 180, 1956.

areoles in epiphytic cacti, but in only two species besides *Disocactus eichlamii* are the areoles known to elongate. In *Disocactus* MACRANTHUS (Alex.) Kimnach & Hutchison, *comb. nov.*,[8] the proliferous areoles are nearly identical to those of *D. eichlamii* and, when old, are even more prominent. In *Nopalxochia macdougallii* (Alex.) Marsh. they may become 3- or 4-branched, even before flowering for the first time, but the wool is so profuse that the scales and solid core are not visible without dissection.

These structures are analagous to pedicels, such as are found in *Pereskia* [Plum.] Mill., which in most other cacti have become lost but which have again partially developed in the genera mentioned above. Little is known of the modifications of this organ in the Cactaceae.

According to Buxbaum[9], this species has a minute, true perianth-tube and a single row of stamens. However, as is seen in our drawing, two distinct series of stamens are evident. Later, Buxbaum[10] stated that this was the only species of cactus known to have a definite perianth-tube, and he describes it in some detail. The bulk of the tubular portion of the flower is receptacular, as are nearly all floral tubes in the Cactaceae.

Although the pollinating agent for *D. eichlamii* is not recorded, its flowers are characteristic of those pollinated by hummingbirds, for the perianth is tubular and highly colored with the stamens and stigma far-exserted. Porsch[11] remarked on their similarity to those of most species of *Tillandsia* (Bromeliaceae) and stated that "among cacti the flowers of *Disocactus eichlamii* represent a model example of the extreme similarity between flowers of very distantly related genera which have become adapted to the same pollinator." The species, however, is highly self-fertile, and even in a glasshouse most of the flowers set fruit without hand or insect pollination. *D. macranthus*, on the other hand, is self-sterile.

Fruits of *D. eichlamii* resulting from hand-pollination with pollen of other species are slightly larger than those naturally self-pollinated and they contain more seeds, possibly because more pollen was placed on the stigma, thus resulting in more ovules being fertilized. In a freshly opened flower the pericarpel is greenish, but it reddens before the flower has withered. Thus the fruits are red from the beginning. White fruits are recorded only by Weingart (quoting Eichlam) and it is probable that those were sun-bleached. The fruits remain undried on the plant for over a year and the seeds usually germinate in the pulp.

Although up to five flowers may be produced simultaneously from one areole, we have never observed more than one fruit at an areole. It can be inferred that fertilization of the first flower of an areolar cluster of flowers inhibits fertilization of the other flowers of that areole. This inhibitory effect operates so long as the fruit persists, for often fruit from the previous year remains on the plant during the second year's flowering period, and in such cases no new fruits are set from those areoles.

It seems most probable that the genera *Disocactus, Chiapasia* Britt. & Rose, *Wittia* Schum., *Bonifazia* Standl. & Steyerm., and *Pseudorhipsalis* Britt. & Rose are reduced derivatives of cacti most nearly represented among living genera by *Nopalxochia* Britt. & Rose (including *Lobeira* Alex.). In this assemblage, *D. eichlamii* is distinguished by its long, tubular perianth with nearly erect segments. In *Wittia* the segments are also erect, but are short. In *D. biformis* they are both long and more expanded. The latter species is the closest known relative of *D. eichlamii*, and is further distinguished by having narrower, less strongly crenate branches, shorter exserted stamens and stigma, and lighter brown seeds. It also is native to Guatemala, but was originally reported, without later confirmation, from Honduras. It was once grown in this country and in Europe but now seems to have disappeared from cultivation.

The only known hybrid of *D. eichlamii*, with *Aporocactus martianus* (Zucc.) Britt. & Rose as seed parent, was created by Weingart of Germany and first figured by Knebel[12] in 1932. The plant is nearly intermediate between its parents, having usually 4-angled stems, weak bristles, and a red, half-opened flower. While it is not known to be in cultivation now it should perhaps be recreated, for Knebel remarked that it had inherited the floriferous qualities of *D. eichlamii*. Because of this character and its flower color, this species seems to be a promising parent for hybridization, the goal being to obtain hybrids with a longer flowering period and an expanded perianth with wide tepals. We have obtained seed from cross-pollinating our plant with *Chiapasia nelsonii* (Britt. & Rose) Britt. & Rose, *Nopalxochia ackermannii* (Haw.) Knuth and *N. phyllanthoides* (DC.) Britt. & Rose.

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[8] *Pseudorhipsalis macrantha* Alexander, Cact. & Succ. Journ. Amer. 14 (2): 20, 1942. This species, which will be treated later in this series, has only one conspicuous character by which it differs from the other two species of *Disocactus*—its yellowish, more expanded perianth. We do not consider this sufficient reason to exclude it.

[9] Buxbaum, F., Cactaceae, Jahrb. d. Deutsch. Kakt.-Ges. 1941 (1): 15-16, 1941.

[10] Buxbaum, F., Morphology of Cacti, 140, 1953.

[11] Porsch, O., Cactaceae, Jahrb. d. Deutsch. Kakt.-Ges. 1938 (1): 67, 1938.

[12] Knebel, C., Monatschr. d. Deutsch. Kakt.-Ges. 4 (2): 26, 1932.

Cultural success with this species depends on warmth, rather acid, nourishing soil and constant moisture. Bud-set is increased if the plant is under-watered during mid-winter; heavy watering should be resumed when buds first appear, early in spring. During summer, lush growth can be encouraged by applying a highly nitrogenous fertilizer, such as a fish-emulsion or a liquid manure. As nearly all the areoles flower, such vegetative growth results in profuse bloom. While this small-flowered species makes the best display as a large specimen, it can be kept both small and highly floriferous by removing most of the youngest shoots, for the older ones bear more flowers. Due to its compact, pendent growth, the species makes an ideal basket-plant, and a large suspended specimen covered with its bright red flowers is an impressive sight. The flowering season is rather short, lasting for about a month in the early spring, but many of the attractive red fruits are always present.

FIG. 45a. *Disocactus eichlamii* (Weing.) Britt. & Rose, U.C.B.G. Number 51.552, *ca.* ⅓ nat. size. Photo by P. C. Hutchison.

The Trip to the Convention

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Travel to the Convention of the Cactus and Succulent Society of America at Berkeley, California, affords for the Easterner, Middle Westerner, or Southerner an opportunity for sightseeing in the deserts and mountains of the West. However a flying trip over the main roads may result in seeing only miles of pavement bordered chiefly by drab flats. Addition here and there of only a few miles together with the proper choice of routes may change a tedious trek through heat and boredom to a rich experience. This paper is designed to aid in the transformation.

THE MAIN ROUTES TO BERKELEY

In the early days of highways, as for example in the 1920's, only a few transcontinental roads were passable. These routes have become the well-known numbered U. S. highways which traverse the low passes, broad plains, and larger river valleys. The highway system of the United States is now a network, and it is no longer necessary or often wise to follow a single numbered route for any great distance. In some cases the main roads of the past are still the best choice for rapid travel, but often they have been superseded by newer highways of better design or construction and with less traffic and particularly with fewer trucks. It is not uncommon for the less prominent highways on the map, often the ones shown in blue instead of red, to be the better choice, not only because of more recent construction and less traffic, but because of fewer towns. Frequently there is better scenery, because either the first-developed routes were the easy ones, which necessarily missed the mountain ranges, or because the view has been obliterated by billboards. The choice of roads from a map is always a gamble, though, because sometimes the road shown as second choice is truly second rate. Through most of the Western States the roads are good and, except near the larger centers of population like those of the Pacific coast, traffic is light.

The main routes to the San Francisco Bay area from east of the Continental Divide fall naturally into three groups, the Northern, Central, and Southern.

THE NORTHERN ROUTES

These are excellent, and the scenic attractions are numerous, but, since succulent plants are nearly lacking, these routes are omitted from this paper.

THE CENTRAL ROUTES

The Central Routes are through southern Wyoming or Colorado and westward across Utah and Nevada. All pass through or near Salt Lake City.*

By following the Central Routes across Colorado and westward, the traveller passes through the following natural vegetation types.**

1. *Great Plains Grassland.* This occurs not only on the Great Plains at low elevations, but also in the high dry valleys of the Rocky Mountains, in many places up to even 9,000 feet or higher. The cactus species are low-growing, and they must be sought among the high grasses.

2. *Juniper-Pinyon Woodland.* The woodland of junipers and pinyons (nut pines) occurs in southern Colorado and in the Great Basin at about 6,000 feet elevation, and it may run upward to 7,000 or to 8,000 feet on south-facing slopes. The cacti are not conspicuous, and they are found only by walking about.

3. *Rocky Mountain Montane Forest.* This lower forest belt is characterized by western yellow pine, Douglas fir, and associated species, and it occurs in Colorado at levels mostly between 7,000 and 9,000 feet. Species of *Sedum* occur on some rocky cliffs.

4. *Rocky Mountain Subalpine Forest.* This upper forest belt is characterized by Engelmann spruce, Colorado blue spruce, limber pine, foxtail pine, alpine fir, and associated species, and it occupies the higher mountains from about 9,000 feet to timber line.

5. *West American Alpine Tundra.* In the Rocky Mountain System beautiful areas of wild flowers occur above timber line, which is at usually between 11,000 and 12,000 feet. A few alpine succulents grow among the rocks.

6. *Sagebrush Desert.* This vegetation type occupies the valleys and plains of the Great Basin between the Rocky Mountain System and the Sierra Nevada of California. The most conspicuous plant is the sagebrush, a medium-sized, gray-green shrub occurring for many miles. In this vegetation type, as in the Great Plains Grassland and the Juniper-Pinyon Woodland, small cacti are to be found in rocky or sometimes sandy areas. Across the Great Basin the Sagebrush Desert occupies the flats at mostly 4,000 to 6,000 feet, the Juniper-Pinyon Woodland the mountainsides at mostly 6,000 to 8,000 feet. Montane and subalpine forests occupy the mountain ranges at higher altitudes.

7. *Sierran Montane Forest.* This lower forest belt begins west of Reno, surrounds Lake Tahoe, and occurs below about 6,500 feet on the western slopes of the Sierra Nevada. It is characterized by western yellow pine with different associates than in the Rocky Mountains.

8. *Sierran Subalpine Forest.* This upper forest belt occurs at levels above 6,500 feet in the passes and on the ridges of the Sierra Nevada. In the descent on the west side of the mountains in California Sierran Subalpine Forest is replaced again by Sierran Montane Forest. This occurs down to about 3,000 feet because of the much heavier rainfall on the coastal side of the mountain axis.

9. *California Oak Woodland.* This vegetation occurs below the montane forest down to about 500 feet elevation in the foothills of the northern Sierra Nevada, and it reappears in the Coast Ranges toward San Francisco Bay. Species of *Sedum* and one of *Echeveria* or *Dudleya* occur in this belt or just above it.

10. *Pacific Grassland.* This is the grassland of the Great Valley (Sacramento and San Joaquin valleys) of California.

West of the summit of the Sierra Nevada there are no native cacti in northern California. Cacti occur in California only east of the Sierra Nevada or in southern California, except that a beaver-tail cactus (*Opuntia*

*This city is to be recommended for its historical interest, but description of cities is not the object of this paper, which deals primarily with natural scenery, vegetation, and (where they are available) succulent plants. Cities and points of historical interest are well marked on the maps and are listed in folders of tourist attractions. This is true of better known natural phenomena, but the most publicized areas are not necessarily the most interesting.

**Cf. Benson, Lyman. Plant Classification. 563-647. Figures XXIV-1-7, XXV-1-34. April, 1957. D. C. Heath and Co., Boston.

basilaris var. *Treleasii)* is native in the San Joaquin Valley east and south of Bakersfield.

The specific Central route to be chosen depends upon the temperament and background of the individual. If rapid, easy driving is an object, U. S. Highway 30 should be followed to near Salt Lake City, and U. S. Highway 40 should be taken to Berkeley. The Continental Divide on U. S. 30 in southern Wyoming is in an area of rolling hills of low elevation (7,000 feet). A traveller once asked Kit Carson to locate the Continental Divide; this took half a day's searching. The route provides little mountain scenery, the best being in the Sierra Nevada at Donner Pass* above Donner Lake, California.

Those wishing high mountain scenery are advised to visit either the higher mountain ranges of Wyoming or the central Rocky Mountain System in Colorado. A good choice is any of the four major routes across Colorado or any combination of them to provide special scenery.

The northernmost of the Central Routes in Colorado, U. S. Highway 40, may be adapted to include Rocky Mountain National Park above Estes Park, Colorado. Here a good road reaches 12,000 feet, well above timber line. Alpine species are numerous, and time should be allowed for strolling around on the tundra. *Sedum rhodiola* is common at this level. Grand Lake is near the western boundary of the National Park. The road passes through rocky semi-desert canyons along the upper Colorado River and over moderate mountain passes such as Rabbit Ears (9,689 feet). On the Utah boundary Dinosaur National Monument is near the road. The green Wasatch Mountain valleys in Utah are rimmed by high mountain peaks. Of greatest interest are the small Mormon communities, each a beautifully organized, tight-knit world of its own. The vision of its founders is reflected in wide streets and large lots. From Salt Lake City westward two fast routes across Nevada are available, via Elko (U. S. 40) or via Ely (U. S. 50). The latter runs at higher levels, and it is more interesting. a few cactus species occur along especially this more southerly route, but they must be sought out in rocky or sandy areas.

The next parallel route southward in Colorado crosses the high passes west of Denver (e.g., Loveland Pass, 12,000 feet), then follows a beautiful canyon past Glenwood Springs to Grand Junction. Mt. Evans (14,260 feet) is approached by a paved side road, but the writer cannot evaluate this because he has seen it only from the air.

The next parallel route to the south offers a variety of scenic features. Inclusion of the Pike's Peak region near Colorado Springs is recommended.

In the foothills along the Front Range (first eastern ridge) of the Rocky Mountains in the vicinity of Colorado Springs there are several species of native cacti. Most of these are on the rocky or gravelly hills.

The Garden of the Gods at Colorado Springs is a red sandstone formation reminiscent of those abundant in northern New Mexico, parts of southern Colorado, southern Utah, northern Arizona, and parts of southern Nevada (cf. Southern Routes). If U. S. 50 is followed westward from Pueblo or from the connecting road from Denver and Colorado Springs, the Royal Gorge and the Black Canyon of the Gunnison are recommended. Each is a spectacular canyon. Westward this route passes the Arches National Monument, affording an opportunity to see another example of the red and other sandstone formations abundant in the Navajo Country to the southward.

The fourth and southernmost parallel route across Colorado has two particularly outstanding attractions in addition to high mountain passes. These are the Great Sand Dunes National Monument and Mesa Verde National Park. Mesa Verde is the cradle of the Pueblo Indian civilization of the Southwest. It is a gigantic mesa, reached easily by automobile, and in the canyons along the edge are innumerable cliff dwellings a few steps below the level of the plateau. Several of these can be visited in a short time. Ruins represent the various stages from the early basket-makers until the time of the great 23-year drought which caused the prehistoric cliff-dwelling Indians to leave the area half a dozen centuries ago to build new homes in places with a better water supply.

The connecting road to the Salt Lake City area of the Central Route and across Utah and Nevada to San Francisco, passes by the Arches National Monument mentioned above.

THE SOUTHERN ROUTES

For those interested primarily in cacti and other succulents the Southern Routes are by far the most interesting. These are the *Plateau Route* and the *Border Route.*

The *Plateau Route* follows primarily U. S. 66, and it may be made the most scenic of all ways to the Convention. For the most part it is at moderately high altitudes and therefore relatively cool.

The best beginning is at Raton, New Mexico. From there U. S. 64 leads through Santa Fe to Albuquerque, via the Navajo and pueblo Indian country, including the occupied pueblos near Taos. A side trip to Bandelier National Monument near Los Alamos is enjoyable because in Frijoles Canyon there are remains of pueblos of ancient Indians and the caves they carved in the soft cliffs of volcanic tuff. Cacti are abundant along the entire route from Raton to Albuquerque, either in plain sight or after a little walk back on the rocky hills or the sandy flats. From Albuquerque Route 66 leads directly to Gallup, but there is a good side trip from San Rafael westward by El Moro National Monument, the Inscription Rock. At the base of this rock a desert "tank", a natural rock basin which catches water and retains it the year around, was or is a stopping place of ancient Indians, the Spanish Conquistadores, and American travellers. The soft rock bears engraved records of the Conquistadores and of many others. On top of the cliff there are two unexcavated prehistoric Indian villages, and the rock itself encloses one of the finest box canyons. Westward on the same road is the Indian village of Zuñi. Now safe from Apache and Navajo marauders, the pueblo Indians have moved down from their ancestral homes on a gigantic red mesa (Zuñi Mountain) to the edge of a neighboring permanent stream. Through all this area and along the road to Gallup there are species of cacti.

From Gallup the road to Window Rock is suggested, and the continuation of the road to Ganado is reported now to be paved. A two-car-width dirt road leads northward to the Canyon de Chelly National Monument. This is a system of canyons about 800 feet deep and with vertical sides of the typical Navajo country red sandstone formed from sand dunes of the time of the great dinosaurs. If the sand on the canyon bottom has been consolidated by recent rains, cars may be driven up the dry wash. Otherwise driving to the south rim of the canyon is safer, and a relatively short hike over a good trail gives access to the "White House", the most photographed subject in the canyon. (This is wild country, food and water should be carried.)

According to recent highway maps the road westward across the Navajo and Hopi Indian reservations

*Donner Pass is only 7,000 feet above sea level, and, since the Great Basin to the eastward is about 4,000 feet, there is not much room for a spectacular rise of really high mountains. Nevertheless, Donner Lake and Lake Tahoe in the California Sierra Nevada are beautiful, and they are located where the Central Routes converge. They may be combined with any route across Wyoming or Colorado.

to Cameron now is all, or nearly all, paved. Local inquiry about this point should be made at the headquarters of the National Park Service at Chinle or at Ganado or some other point in the area. If this road has not been paved, the writer hesitates to recommend it for beginners.

Another road leads from Ganado to Chambers on U. S. 66 and thence to the Petrified Forest National Monument, where a short bypass north of the main highway skirts the edge of the Painted Desert. This painted desert is more gaudy than the one near Cameron described farther on. Another road runs southward through the Petrified Forest to U. S. 260 which rejoins U. S. 66 at Holbrook.

At the Petrified Forest there are driftwood logs of an ancient conifer *(Araucarioxylon)* turned to stone. These were desposited in the gravel and sand of a Mesozoic fresh water lake which covered hundreds of miles in northern Arizona, southern Utah, and western Colorado. This deposit of sand and beautifully worn colored beach pebbles (the Shinarump Conglomerate) is mostly eroded away at the Petrified Forest. In the hills along the northern edge of Holbrook and especially just west of the city the Conglomerate still forms a thick layer with embedded petrified logs like those in the National Monument. In the Monument rapid erosion of the unconsolidated Shinarump Conglomerate has allowed the logs to be lowered gradually through a considerable distance. Consequently they are concentrated at the present surface. Many are broken because, although the petrified wood is exceedingly hard, it is also brittle. Whenever it is unsupported, the end of the heavy log tends to break off. The petrified wood is highly colored and it takes an excellent polish.

The meteor crater west of Winslow was formed by a gigantic meteorite which struck the Earth with tremendous force. The crater is well worth the short side trip.

The relatively primitive Indian cliff dwellings in Walnut Canyon just east of Flagstaff and the Sunset Crater and Wupatki National monuments just north of U. S. 66 are special attractions. A side trip from Flagstaff to the museum of Northern Arizona north of the city and to San Francisco Peaks (as for example to Snow Bowl, at 9,500 feet) is an interesting change to montane and subalpine forests after many miles in high grassland and Juniper-pinyon woodland.

At Williams, Arizona, a choice must be made between continuing westward or going northward and then west. Either route offers a fair variety of cacti and other succulents such as yuccas and century plants.

The westerly route follows U. S. 66 to Los Angeles by way of either Needles or Hoover Dam, Boulder City, and Las Vegas. In June or July the weather will be hot below 3,000 feet elevation, as between Kingman, Arizona, and Victorville, California. Many prefer to leave Kingman in the late afternoon and to make most of the trip at night. However, this eliminates seeing Mojavean Desert,* which has several large succulent plants.

The northerly route turns off just east of Williams, Arizona. It follows the south rim of the Grand Canyon, most of which may be seen in driving eastward from Grand Canyon Village to Cameron. The Grand Canyon should be viewed at various times from morning until evening. However, human senses are dulled soon by such coloring, and greatest appreciation requires periods away from the canyon rim.

The road north across the Navajo Indian Reservation to Cameron passes through a pastel Painted Desert far more delicate than the one at the Petrified Forest. The Gap is a Navajo trading post. Navajos live in their characteristic hogans in the small canyons here and there along the road, tending their special type of sheep and raising their desert-adapted strain of corn. The road crosses the Colorado River at the Navajo Bridge, a suspension type 467 feet above the water. The neighboring Echo Cliffs and the Vermilion Cliffs are outstanding subjects for color photography. There are auto courts at the northwest end of the bridge, and spending the night here is suggested. Both in the evening and in the morning, as well as throughout the day, there is a constant change in colors, and sitting under the shade of a rock, watching the pageant, and clicking the camera at intervals is a rewarding experience. The Kaibab Plateau is covered by beautiful Rocky Mountain (Montane and Subalpine) forests. A side road leads to the north rim of the Grand Canyon.

Kanab, Utah, is an excellent headquarters whenever the accommodations are not taken up by a moving picture company manufacturing a horse opera. The town is at the center of the scenery capital of the United States. A side trip in any direction is worthwhile. Particular attention is called to the Pipe Spring National Monument, Bryce and Zion National parks, and Cedar Brakes and Capitol Reef national monuments. In addition there are scores of little known and often unnamed areas any one of which would be a celebrated National Park if it occurred elsewhere. The scenery continues as far west as St. George. From there westward to Victorville, California, is relatively uniform Mojavean Desert. It is interesting, but there are few highlights along the main road.

In the neighborhood of Las Vegas, Nevada, the Valley of Fire (red rock formation), Hoover or Boulder Dam, and Lake Mead are points of both general interest and scenic attraction. A less known but beautiful area is Kyle Canyon in the Charleston Mountains about forty miles north of Las Vegas. Cacti grow near the road.

From the vicinity of Las Vegas various routes lead into California. The most travelled is via Baker and Barstow to Los Angeles. In the winter season from November through April the Death Valley route would be listed as a five-star attraction. However, after May 1 the Valley is hot and only the relatively uninteresting main road ordinarily is open for traffic. In June or July using this route could lead to disaster. Those who are tempted should write to the Superintendent of the Death Valley National Monument, Death Valley, California, for advice and instruction. If Southern California is to be by-passed, the road from the Charleston Mountains to Tonopah, Nevada, and thence westward to Mono Lake, California, across Tioga Pass, through Yosemite Valley and to the San Francisco Bay region should be taken. Yosemite will be discussed farther on.

The *Border Route* lies near the Mexican boundary, and it centers about U. S. 80 from El Paso, Texas, westward. This is the cactus and succulent route, and it is recommended highly despite the inevitable heat of summer. As on the Plateau Route, along much of the way there are two rainy seasons, the lesser from October until the end of April, the greater in July and August. For this reason the Southern Route is better considered for a return trip than for traveling westward. If the summer rains come on schedule, the higher plains area (above 4,000 feet) and higher portions of the desert (above 2,500 feet) may be lush and green, provided, of course, it is a relatively wet summer. However, the weather in June is likely to be dry and with exceedingly low humidity, whereas in July and August it is almost certain to be humid as well as hot.

In western Texas and southern New Mexico every

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*Mojavean Desert is the only vegetation type along this version of the Southern Routes not described above under the Central Routes. It is characterized by creosote bushes and the Joshua trees, *Yucca brevifolia*. It occurs between 2,000 and 3,500 feet or (in the lee of the high mountains) 5,000 feet. The high mountain vegetation types are missing because the road goes over no significant passes. This is true also of the Border Route.

low mountain range has a wealth of cactus species; whenever a rocky area is passed, it is worthwhile to walk around. Two highlights are the Big Bend National Park in Texas and the Carlsbad Caverns in New Mexico. Both areas are rich in cacti. Big Bend is long on scenery, especially in the Chisos Mountains and Santa Elena and Boquillas canyons. It has many cacti. It is wise to phone ahead to National Park Concessions for a cabin reservation.

From El Paso westward moderately high grassy plains extend across New Mexico and into Arizona. There are characteristic species of cacti, mostly small ones more or less hidden in the grass. The miniature tree, *Yucca elata,* the palmilla, is abundant. Much may be added to the trip by visiting the Franklin Mountains just north of El Paso and the Organ Mountains near Las Cruces. Each area is rich in cacti, and it includes yuccas, sedums, and other succulents. The White Sands are on the recommended list. Near El Paso *Agave lechegüilla* is prominent on the hillsides, as it is throughout the Chihuahuan Desert in western Texas and along the southern edge of New Mexico.

Northwest of Willcox, Arizona, the road crosses a dry lake which usually shows one of the finest mirages in the West. The nearby Chiricahua and Huachuca mountains are worthy of a visit if time permits.

Tucson is the cactus capital of the United States, and time should be made available for side trips. The best of these are to the Saguaro National Monument just to the eastward, Tucson Mountain Park to the west, and Sabino Canyon to the northeast. Each area is dominated by the giant cactus or saguaro *(Cereus giganteus)* and by many other large cacti. All three are within a few miles of Tucson, and the Saguaro National Monument and Sabino Canyon may be combined with a visit to the Mt. Lemmon area or summit region of the Santa Catalina Mountains. An excellent high-gear road runs through the cactus country to the base of the mountain range and on up through spectacular canyons into beautiful Rocky Mountain Montane and Subalpine forests.

The area about Tucson and thence for many miles westward is Arizona Desert. This is the richest of the cactus deserts in the United States. The Organ Pipe Cactus National Monument on the boundary between Arizona and Sonora, Mexico, is of particular interest to those who wish to see cacti. However, because it is a little travelled (though good) road, there is some hesitation about its recommendation for mid-summer.

U. S. 80 is suggested for travel to Phoenix because it passes through outstanding forests of jumping cholla *(Opuntia fulgida).* Unfortunately in some areas these have been injured by a recent fire. The Boyce-Thompson Southwestern Arboretum at Superior is on a relatively short side trip east of Florence Junction. The Apache Trail is on a side road from Apache Junction. This road should be followed as far as Fish Creek Canyon, for up to that point the Apache Trail traverses one of the best bits of scenery in the Southwest. The Desert Botanic Garden at Papago Park is on the right side of the highway just past Tempe.

From Phoenix the trip on the main highway westward to southern California is more or less routine and relatively hot, but three scenic areas are along the way. These (near U. S. 60 and 70) are as follows:

1. Palm Canyon (Arizona). The Palm Canyon of Arizona is illustrated in the frontispiece of *The Trees and Shrubs of the Southwestern Deserts* published in 1954 (the writer in collaboration with Dr. Robert A. Darrow; first edition, 1945, under the title *A Manual of Southwestern Desert Trees and Shrubs*). The Kofa Mountains are an exceedingly rugged range of red lava, and Palm Canyon is a gash about 2,000 feet deep running east and west. The floor of the main canyon is in nearly perpetual shadow. Along the trail in this canyon are bedding grounds of the desert bighorn sheep, and (particularly in the threadlike side canyons on the north face of the main canyon) there are native fan palms. The Kofa Mountains may be reached easily now by turning south from Quartzite, Arizona (from U. S. 60 and 70 combined here), for 19 miles on the road to Yuma. At this point a good graded dirt road runs eastward perhaps 10 miles to the mouth of Palm Canyon; about a half-mile hike is necessary to reach the palm trees. There is no gasoline or water available in the Kofa Mountains, and a good supply of both should be carried.

2. Joshua Tree National Monument (California). The easiest way to visit the Monument is to turn north two miles west of Shaver Summit and to follow the road toward Joshua Tree. At Cottonwood Spring there are a few native palm trees, and along the road beyond Pinto Basin there is an excellent cactus forest of teddy bear cholla *(Opuntia bigelovii).* A side trip should be made to Salton (Keyes) View which overlooks the Coachella Valley and the Salton Sea.

3. Palm Canyon (California). This canyon is a few miles west of Palm Springs. It includes innumerable palm trees, and the canyon itself is of a wholly different type from the one in Arizona.

Date Gardens are near Cathedral City. From here the main roads are followed westward to Los Angeles.

The route through Phoenix and from there westward to Los Angeles is recommended because it is more interesting than U. S. 80 from Tucson westward (except for the sand dunes west of Yuma and the grade to Mountain Springs). Because it lies at an average of about 2,000 feet elevation, this route from Phoenix is a little cooler than the lower road (U. S. 80) through Yuma. U. S. 80 is suggested for summer travel only if San Diego rather than Los Angeles is the objective.

THE NATIONAL PARKS AND MONUMENTS

A rating system for National Parks and Monuments depends upon taste and background. For scenery the writer would place the leading ones in the following groups, then run for cover. There is no special order within each group.

I. Mt. Rainier (Washington); Glacier (Montana), Grand Teton (Wyoming); Yosemite and Death Valley (California); Bryce, Zion, Capitol Reef and Monument Valley (not even a National Monument) (Utah); Grand Canyon and Canyon de Chelly (Arizona).

II. Olympic (Washington), Crater Lake (Oregon), Rocky Mountain (Colorado); a host of National Parks and National Monuments and several areas not under the National Park Service, including more mountains and canyons in southern Utah and northern Arizona than can be counted. These places are with excellent scenery but not quite equal to those in the first category.

Yellowstone National Park is not rated because its chief attraction is the geysers. Yellowstone Canyon is beautiful, but otherwise the scenery, though attractive, is ordinary for the Rocky Mountains.

Because it is near several routes to Berkeley from the East, Middle West, and South and within easy reach from the San Francisco Bay Region, Yosemite is singled out for special description. In May, June, and early July while the streams are full, this is the show place of California. Since California has no summer rain, except showers in the high mountains, the falls at Yosemite dry up rapidly in July; the Park should be visited *before* the Convention. Yosemite is included easily (by turning south from Carson City, Nevada) with any Central Route or (by turning north from Las Vegas, Nevada) with the Plateau Route.

From Leevining on the western shore of Mono Lake the Tioga Pass Road ascends the Sierra Nevada rapidly to 10,000 feet. This road, viewed through the eyes of

beginners in mountain travel, has acquired a bad reputation. This is unfortunate because the scenery is superb and most of the road is an ordinary paved two-car-width highway of moderate and nearly uniform grade. Two areas have contributed to the fairly common impression that the road is a tough one. One is a short stretch of shelf road east of the summit—this is a wide shelf amply protected on the outside and with the westbound traffic on the inside. The other is a twenty-one mile stretch of typical forest type mountain road from Tuolumne Meadows to Lake Tenaya—this is paved and of car-and-one-half to two-car width. Travel is perfectly safe at mostly 20 to 25 miles an hour. Some stretches are steep, and the Tioga road is not recommended for house trailers. The picture of the road presented above is realistic from the point of view of those who are used to mountains; it may seem fantastically optimistic to those without mountain experience. Each person is certain to get his money's worth from the trip; he will talk for the rest of his life about either the scenery or the harrowing experience.

Tioga should not be attempted in June without inquiry as to whether the Pass is open because snow may block the road. The California Highway Patrol offices supply information about this or any other road in the state.

If the Tioga Road is closed, or if another route is chosen, Yosemite may be reached with ease at almost any time of the year by any of three roads from the San Joaquin Valley on the west. The two roads from the north and south (leaving U. S. 99 at Manteca and at Fresno) cross mountain ridges of about 7,000 feet elevation. The middle road from Merced does not rise above the height of the floor of Yosemite Valley (4,000 feet).

Yosemite Valley was formed by the mountain glaciers of Pleiostocene time. Earlier it was a V-shaped stream-cut valley. Now it has the characteristic U-shaped cross-section of a glacial valley. The cliffs along the edges are almost vertical, and they average about 3,000 feet in height. The canyons down which the side streams entered the Valley in pre-glacial times were cut away by the glaciers, and the streams were left to tumble from several hundred to more than one thousand feet in a single jump.

At Yosemite Valley much of the finest scenery may be seen by car. Those who are inclined to be athletic may wish to take the ledge trail (1-1/4 miles horizontally, 3/5 mile vertically) to Glacier Point. However this Point may be reached by car by taking the Wawona Road from the lower end of the Valley and then the turnoff to Glacier Point. Glacier Point is a rocky ledge above a sheer drop of 3,000 feet into Yosemite Valley, and the view is like that from an airplane.

Those who are not strongly inclined toward the athletic type of hiking will be rewarded richly by walking about one mile from the head of Yosemite Valley to Vernal Falls or by a somewhat longer hike to Nevada Falls. Those with greater energy to expend may wish to keep on to the summit of Half Dome which is about 5,000 feet above the Valley, most of this difference in altitude being due to a sheer precipice. The view from Half Dome includes the entire Valley and a large section of high country ranging up to 13,000 feet. The last part of the ascent is steep and across a smooth face of granite. It is made by holding on to a cable—at least this was true in 1926 when the writer had more energy.

The Mariposa Grove of Big Trees *(Sequoiadendron giganteum)* near Wawona is on a short side road from the main one leading out of the Park toward Fresno. As, with characteristic modesty, any Californian will admit, the size of these trees is truly fantastic. Above the irregular swellings of the trunk near ground level, the Grizzly Giant is about 30 feet in diameter. This is the length of an average school or college classroom.

TIPS FOR A BETTER TRIP

1. CAR PERFORMANCE. Long grades place an unusual strain upon an automobile, and the cooling system should be checked before starting. A dirty radiator, a worn fan belt, or an ineffective thermostat may be a source of trouble. The boiling point of water is lower at high altitudes, and motors which run cool under standard Eastern or Middle Western circumstances may become hot on long grades. Frequently the temperature will run just under boiling until the car stops. After stopping, the water in the radiator will boil, and it is important not to open up the radiator cap until boiling has stopped, because the steam and hot water thrown into the air may scald the individual who opens the radiator. If water is added, it should be poured in slowly with the motor running in order not to crack the cylinder block. Probably 95 per cent of car trouble in mountains and deserts is due to overheating. It results not only in the boiling of water in the radiator, but also in vapor lock. In the event of vapor lock, curbing impatience is standard first aid. The cure is waiting for the vaporized gasoline in the gas line to cool so that it becomes liquid. At high altitudes also it may be necessary to change the setting of the carburetor so that the proportion of gasoline to air is not too great. If the motor kills readily, this is likely to be the difficulty.

2. THE BY-WAYS. The recommendations in this paper are based upon visiting the side roads into desert mountains and other out-of-the-way spots, for the scenery is there rather than directly on the main roads. Most of the places discussed above are reached easily, but many unnamed spots are on inferior roads. If these are taken, special precautions are a necessity. These relate to the following:

a. *Thirst and hunger*. Several gallons of *water* should be carried. Places labelled on road maps as "Valley Falls" or "Smith's Well" may be anhydrous, and, when there is water, it is likely to taste like somebody's favorite prescription. A gallon or more should be taken on even the main highways across the open desert. Off the main routes a supply of *food* may be important, too.

b. *Personal overheating*. If a car is stalled in the desert some simple *shade* may be helpful because a still automobile becomes unbearably hot. However, in even the rare 120° weather, the atmosphere usually is so dry that sitting in the shade is not unbearable so long as air may circulate. One woman always takes a beach umbrella for emergencies. Probably this is unnecessary, but the basic idea is good.

c. *Fuel for the car*. The tank should be *full* of gasoline. A town on the road map may have disappeared or it may consist of no more than an abandoned ranch or trading post. Along even the main highways two gas stations may make a town, one a spot on the map.

d. *Cloudbursts*. In the summer rainy season (mostly July and August) *dry washes* should be treated with respect even though the sky above is clear. If the wash heads in a mountain range, a local cloudburst ten miles away may send a wall of water. Occasionally parked or other automobiles are caught in floods. Those who camp on the clean dry sand under the inviting trees in a wash may wake up swimming.

e. *Sand*. The shoulders of even main highways must be examined critically before leaving the pavement. If other cars have left ruts, it is safer to stop farther on or at least to keep two wheels on the edge of the blacktop. The best-looking dirt on or near a side road can turn out to be bottomless sand. If the car is driven into a sandy place and the wheels begin to spin, they should be stopped at once to prevent burying them.

If the car is stuck in the sand, often the best method of escape is to raise the back end high with a bumper jack, then to push the car over sideways so that the back wheels fall on firm sand beside the holes they have dug. This requires the proper kind of *bumper jack*, e.g., hydraulic, and a short *board* to place under it. Next the air pressure in the tires should be reduced to about 15 pounds. At this point a *tire gauge* is a good item of equipment. The car, now resting on the surface sand, should be rolled slowly forward and backward a few inches until the sand is firm enough for a slow, steady take-off. Once the car is off the sand, speed should not exceed 30 miles per hour until the tires are reinflated. A *tire pump* is convenient to have along.

Those who travel far from the beaten track in the desert carry a *shovel*, an *axe*, and *wire mesh* (firm "chicken wire" or hardware cloth) long enough to reach from the back to the front wheels of the car. The shovel is useful for digging a hole down to the level of the bottom of the tire, the axe to cut brush to make a road bed for the back wheels, and the wire mesh to make a still better portable road bed if there is much distance to cover across the sand. Two wide pieces of stiff woven wire the size of the car put down and taken up alternately make travel across even a sandy wash possible.

f. *Inquiry.* In the desert local inquiry about secondary roads may be necessary because their condition changes from time to time. Asking whether a road is "good" or "bad" is futile, for the answer depends upon experience and temperament. The city dweller recently transplanted to the desert considers any unpaved road impassable; the desert rat eyes a gravelled road with wonder. The first question to the informant is, "Have you been over the road recently?" If the answer is negative, someone else should be asked, because often those who give the most information never have been over the road. If the state or type of road is dubious, several people should be consulted and their answers checked against each other because judgments vary. Questions may cover width (1-car, 2-car, car-and-one-half), road bed (sand, clay, gravel, rocks), upkeep (chuck holes, wash-outs, recency of grading), approximate reasonable driving speed (or the time required to reach a particular place), presence of fords (including those with quicksand), steepness of grades, and location of supplies, water, food, and gasoline.

If water is taken along, the desert is an excellent camping place, and many sunrises and sunsets are to be remembered for years. The nights can be amazingly *cold*, and plenty of covers are in order.

3. POISONOUS ANIMALS. Poisonous animals should not cause much worry. Rattlesnakes are seen only rarely. Since the direct summer sun soon kills them, especially in the *lower* deserts (below 3,500 feet elevation) they tend to be nocturnal or to crawl in the early morning or late afternoon. There is little danger of being bitten unless one moves too fast through high grass or low brush or in the dark. Given any reasonable time, the snakes will move out of the way. If they can't escape, they coil and strike. Their venom is dangerous, but only occasionally fatal. High leather boots furnish some protection from both snakes and dirt. Treatment of snakebite has been changed in recent times by the use of cold instead of incision. A physician in the rattlesnake country should be consulted concerning methods.

Gila monsters are encountered rarely and then in the lowest level of the deserts of Arizona (below 3,000 feet). Ordinarily they should cause little worry. Black widows are abundant but unobtrusive, and they can bite through only tender skin. Scorpions cause trouble occasionally but not commonly.

4. CLOTHING. For mountain or desert travel, old, or at least not fancy, clothes are in order. "Cowboy" clothing will amaze only a few Westerners; most have been to the movies.

5. PLANT INSPECTION. Arizona and California require inspection of all plants, fruits, and vegetables. This is for protection of farms from inadvertant introduction of pests or diseases. In general pressed specimens are not questioned, provided they are obviously legitimate scientific material. Living plants must have the roots cut off because of Ozonium root rot (if they came from places along the Southern Routes). With cacti and other succulents, this causes no damage. Much depends upon the individual inspector, and it may be preferable to ship the plants home before reaching the state border station.

6. THE CALIFORNIA CLIMATE. California is green in winter and dry and brown in summer, the reverse of the East, Middle West, and South. The trip will be happier if greenness is not anticipated, just as it would not be expected in Illinois in January.

Temperatures are unbelievably variable, and they are influenced chiefly by two factors—(1)mountain barriers between the area and the ocean, and (2) altitude. Latitude is less important. The ocean and higher altitudes are cooling factors. One should come prepared for anything. Berkeley is almost sure to be cool, but on rare occasions it may be hot.

COLORADO CACTOPHILES—YEARLY REPORT

Regular monthly meetings held, 9; Field trips, 1; Picnic and hike, 1; Christmas party, 1. Membership consists of 17 adults and 11 juniors.

A proposed course of study was drawn up in November 1955 for the Colorado Cactophiles, to be used during the year of 1956.

It was a general study of Cactaceae with emphasis on our native Colorado cactus. It consisted of the following:

1. Maintain notebooks for personal reference
2. Glossary of terms pertaining to cacti
   a. pronunciation
   b. meaning of Latin words in common usage
3. Main genera found in the United States
   a. difference in the genera to be illustrated by specimens of various genera
4. Cultivation of cacti in general
   a. soil
   b. water
   c. light
   d. temperature
   e. fertilizers
   f. pests and their control
   g. propagation
5. Gross anatomy of cacti

By following the above course of study, we have had a busy and educational year.

MARY ANN HEACOCK
Secretary-Treasurer

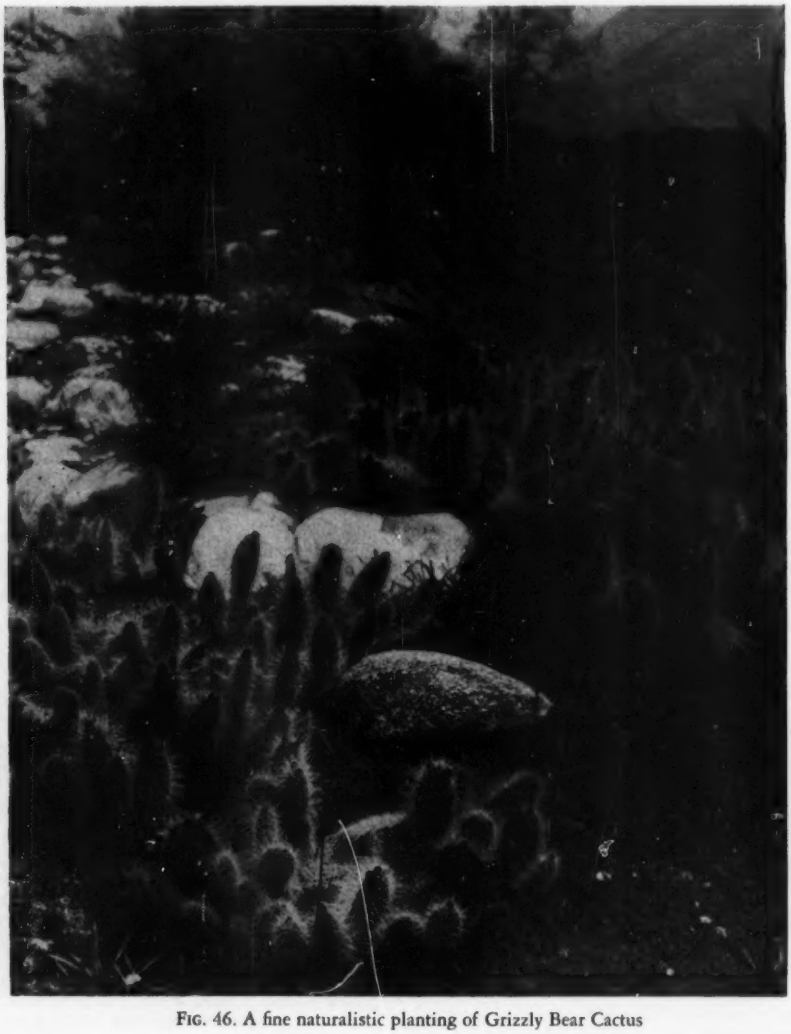

FIG. 46. A fine naturalistic planting of Grizzly Bear Cactus

A Visit to Rancho Santa Ana Botanic Garden

By J. R. BROWN

A visit to a fine garden is always an enjoyable experience for a lover of plants and when on a bright sunny morning in late March the opportunity arose to visit the Rancho Santa Ana Botanic Garden at Claremont, California, I quickly availed myself of it. This garden, the director of which is Dr. Philip A. Munz, is devoted to the native plants of California and within this garden is an area known as the desert garden, where the plants more or less associated with desert conditions are grown and where one can see a very fine representative collection of our native desert flora.

On a previous visit the plantings of Stylophyllum were greatly admired, large masses making a very effective ground cover. The Stylophyllums are growing along the partially shaded western border of the desert garden where it merges

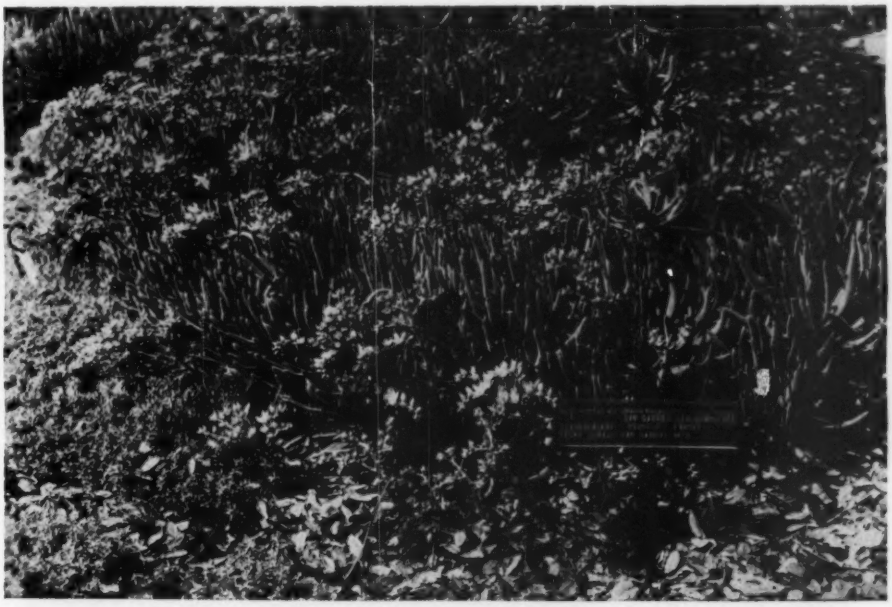

FIG. 47. *Stylophyllum nudicaulis*

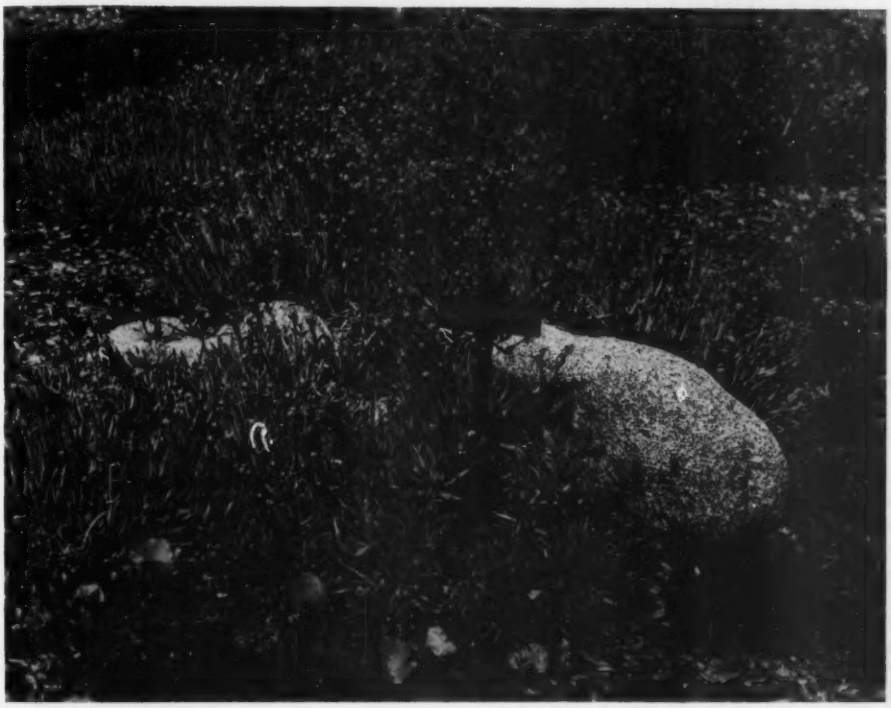

FIG. 48. *Stylophyllum hassei* with *S. insularis* at upper right. Note the effective, weedless ground cover

FIG. 49. A luxurious carpet of *Stylophyllum insulare*. The flowers at the edge are California Poppies

with the tree planted slope of the main garden. The largest plantings of Stylophyllum were of plants named *Stylophyllum insulare* and *Stylophyllum hassei,* the former plant of a bright green color and large flattened leaves, the latter seemingly of more compact growth and of a greyish-glaucous color. On account of the brighter green color of *Stylophyllum insulare* it seemed more attractive. Smaller groups of other Stylophyllums were also seen, *Stylophyllum edule* and its very narrow leaved form *Stylophyllum parishii.* Our well known Stylophyllum from San Gabriel Canyon, *Stylophyllum nudicaulis,* and which seemed to be the earliest to flower, the others just beginning to open up.

The Stylophyllums are not remarkable for colorful flowers and their value as garden plants lies in the dense growth of foliage. They seem to be much better garden subjects that Dudleyas and it is surprising to observe, at least in this garden, the luxuriant growth some of them attain.

Fine groups of native cacti are to be seen, *Opuntia basilaris,* the Beaver Tail, is quite prominent by reason of its purplish-tinged pads, *Opuntia erinacea,* the Grizzly Bear, also shows up very effectively. It was a little early in the sea-

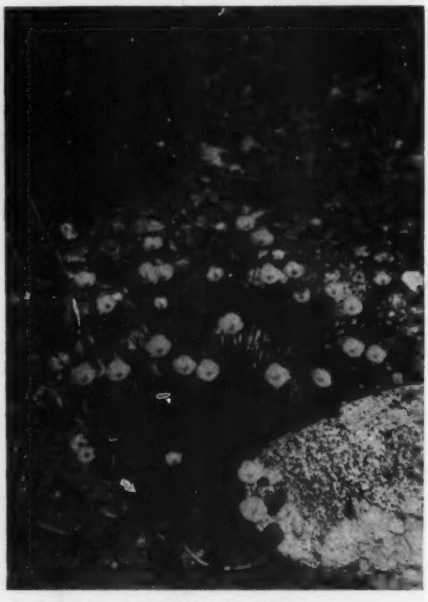

FIG. 50. The smaller, tufted California Poppy

FIG. 51. *Stylophyllum insulare* with *Agave deserti* in background

FIG. 52. *Agave shawii*

son to see cactus flowers but buds were evident on many of the plants and the young growth on many of the Opuntias was very striking, the new spines glittering in the bright sunshine. This was especially noticeable on the plants of *Opuntia ramosissima.* A colony of *Bergerocactus emoryi* seemed to be growing very well, the bright color of the new branches contrasting with the dingy color of the older growth. Numerous plants of other cacti are to be observed, *Mammillaria, Echinocereus,* and *Ferocactus* all well represented.

Near the lower end of the garden an old specimen of *Agave shawii* was flowering, the flower stem about ten feet in height. *Agave deserti,* a rather handsome plant, its pale, glaucous grey-green leaf color in sharp contrast to that of *Agave shawii,* was seen here and there.

Apart from the succulent plants innumerable other desert plants are to be seen, the colorful annuals were beginning to make quite a showing, the prettily marked *Nemophila maculata,* Five Spot, was making a fine show, *Gilia exilis, Gilia capitata,* and *Coreopsis calliopsidea* were also in flower, numerous others were coming along fast. The California Poppy, *Eschscholtzia californica,* with its glowing golden color was very prominent, while tufts of its smaller cousin,

FIG. 53. Beaver Tail Cactus

Eschscholtzia caespitosa var. *hypocoides* was also very attractive. Here and there as is its nature, the Blue-eyed Grass, *Sisyrinchium bellum* was adding its color.

Among the more woody plants noticed were low mats of the widely known Bear-berry or Kinnikinik, *Arctostaphylos uva-ursi,* this makes an excellent ground cover in southern California. *Helianthemum scoparium,* one of the rock roses, also formed pretty little mats with clear yellow flowers. These and many others help to add interest and beauty to the usual succulent collection seen in so many cactus gardens.

Apart from the pleasure of enjoying the plant life is the restfulness and tranquillity which prevails in a large garden of this nature, and it is surprising that so few take advantage of so much.

NOTE: The nomenclature of Stylophyllum is somewhat confusing and to those who wish to go into this, the most recent and complete study, entitled, A Revision of Dudleya, subgenus Stylophyllum, by Reid Moran in Desert Plant Life, 1942, 190, should be consulted.

FIG. 54. View of the Moir estate on the Hawaiian Island of Kauai

Garden of Succulents in Hawaii

From Honolulu Star-Bulletin

By JOE ARAKAKI

Lihue, Kauai, May 7—Over a period of 24 years, Hector and Sandie Moir of Poipu have developed a rock garden which is considered one of the finest of its kind in the world.

The five-acre garden today boasts nearly 2,000 plants, including about 500 cactus plants.

When the Moirs first moved to Poipu back in 1930, they had a big problem. The land was covered with rocks. The place was dry and windy. They couldn't grow tropical plants.

It would have been a much bigger task to get rid of the rocks which were neatly piled here and there by the ancient Hawaiians who had cleared the land to plant sweet potato and yam.

It was then that they decided to develop "dry land tropicals." Their hard work and "know how" over the years brought rewarding results. They have built up a rare collection of cacti, aloes and plumerias.

A series of about 14 small ponds filled with water lilies gives the rock garden a striking appearance. The plants in the garden have their origins in Africa, South America, Mexico, Central America, Southern United States and India.

The Moirs have a Euphorbia ingens which stands 20 feet high. The aloe collection, numbering around 150 plants, is the largest private aloe collection in the world.

They also pointed out the 70 different shades and colors of plumeria flowers in the garden. In contrast to the dry land tropicals, the ground is covered with indigenous akulekules. The Moirs said that the crotons were planted to give "color" to the garden.

Other types of vegetation in this unique garden are giant yuccas, stapelias, kou trees, agave (century plants), palo verde trees, (acacia family), jade trees, wiliwili and small Hawaiian pineapple plants.

The Moirs are now developing an orchid garden consisting of vandas and dendrobiums.

Hector and Sandie have named their place, the Pa'u-a-Laka Gardens, the Gardens of the Garden Island. It overlooks the sea.

EDITOR'S NOTE: Our well-known Society members Sandie and Hector Moir have opened their estate, Pa'u-a-Laka Gardens, to the public. If your friends are on the island of Kauai, be sure that they see these beautiful gardens.

"Berkeley in '57"

THE SEVENTH BIENNIAL CONVENTION OF THE CACTUS AND SUCCULENT SOCIETY OF AMERICA, INC.

Berkeley, California, July 12-16, 1957

NEWSLETTER NO. 5—APRIL, 1957

FASHION SHOW

As in past conventions, a fashion show is being planned that will have our favorite plants as its theme. During one of the fun-sessions a number of highly original creations will be displayed for your approval, and prizes will be awarded to the winners. Among the articles to be featured will be hats, corsages, shirts, trousers and dresses, all decorated with cactus designs or even made partially or entirely of plant material. Prizes will also be awarded for the funniest and the best-designed costumes. So between now and July let's see what the natural talent and ingenuity of our female members can produce in this wide-open field. One hint for the designers: don't be too conservative in your designs for ladies' hats, for you won't have to model them yourselves—this demanding task is usually assigned to the menfolks.

I.O.S.

On the day after the Convention, during the afternoon and evening of Wednesday, July 17, members of the I.O.S. (International Organization for Succulent Plant Study) will deliver at the Hotel Shattuck a series of short, technical papers on various aspects of the taxonomy, phylogeny, morphology and distribution of various genera and species of cacti and other succulents. While few of you will consider every talk interesting, you are urged to attend at least some of them, for a familiarity with these subjects will surely broaden and deepen your interest in succulents. A schedule of titles and speakers will be issued to you in Berkeley so that you may attend those talks which interest you most.

The I.O.S. was founded in 1950, and its membership, drawn from many countries, is composed of professionals and amateurs engaged in research on succulents. Because many of the members from this country will be attending the Convention, the Third National Meeting will be held at the same time. The public is invited to hear the reading of research papers by such members as Dr. Lyman Benson, Dr. Norman Boke, Dr. E. Yale Dawson, Myron Kimnach, P. C. Hutchison, Dr. E. B. Kurtz, Dr. George Lindsay, Dr. Reid Moran, Dr. C. H. Uhl and others.

COLLECTIONS

As a final example of the collections you may see in this area we must mention that belonging to Robert Flores, 905 El Camino Real North, Salinas, Calif. This combined private collection and nursery, which operates under the name of "Las Flores", features cacti, succulents and native California plants, and is located about 9 miles north of Salinas, on Highway 101, along which most of you will travel to or from Berkeley. You will find several glasshouses crammed with specimen cacti, mostly Mexican species, of which many were collected in the field by Mr. Flores himself. Seedling cacti are also grown on a large scale, and many of these are new South American species. In addition there is a whole field of grafted cacti, all on large plants of *Trichocereus* stock. Cactus crests form a conspicuous part of the collection and comprise one of the largest selections in the state.

TALKS

On the evening of July 15, Mrs. Cactus Pete will give a talk on cultivars of *Epiphyllum*, illustrated by color slides; certainly few persons are as well qualified to speak on this subject. On Saturday afternoon Drs. E. B. Kurtz and Stanley Alcorn will discuss their interesting experiments on the germination of cactus seed, a subject of practical value to many of you. Friday evening Dr. Norman Boke of the University of Oklahoma will discuss "Development and Form in Cacti", describing the varied and fascinating forms in cacti and their significance.

As yet a schedule of talks has not been published because of the confusion the inevitable changes would have caused. However, at this time we list a complete, though provisional, program of such talks, of which a final listing will be distributed at the Conevntion.

Friday, July 12
- afternoon:
  - "Memories of the 1955 Convention", by Homer Rush
  - "Collecting Succulents in the Orient", by Dr. Reid Moran
- evening:
  - "Collecting Cacti in Mexico", by Robert Flores
  - "Development and Form in Cacti", by Dr. Norman Boke

Saturday, July 13
- afternoon:
  - "Some Factors Relating to Germination of Cactus Seed", by Dr. E. B. Kurtz and Dr. Stanley Alcorn
- evening:
  - "Kalanchoe and Sedum", by Homer and Ethel Rush

Sunday, July 14
- evening:
  - "Collecting Cacti in Western South America", by Harry Johnson
  - "Succulent Portraits from Africa", by P. C. Hutchison

Monday, July 15
- evening:
  - "Epiphyllums and some of their Cultivars", by Mrs. Cactus Pete
  - Horticultural Symposium with Harry Johnson Sr., Howard Gates, John Rodgers, Al Irving, and Myron Kimnach
  - "Favorite Kodachromes of Cacti and Succulents", by the Membership

Tuesday, July 16
- evening:
  - "Cactus Collecting on an Expedition to the Gulf of California", by Dr. George Lindsay

A FINAL WORD

This concludes our series of informative articles on the Convention. If you are not by now convinced that it is absolutely essential that you attend, we're afraid you can only be regarded as one of those rare cactophiles who do not like to travel or discuss your hobby with kindred spirits or see exciting collections of plants or listen to authoritative talks on succulents—therefore we shall not further try to convince you. Needless to say, all the real enthusiasts will attend the Convention, and to you wonderful people we need only say again that you should send in your reservations at once and that we will—

SEE YOU IN BERKELEY!!

MYRON KIMNACH
Secretary and Publicity Chairman
5918 Jordan Ave.
El Cerrito 9, Calif.

SPOTLIGHT ON ROUND ROBINS

Robin membership has been, on the whole, quite constant, with relatively few resignations, most of which are from lack of time, not lack of interest. However, one of the original Robins, "For Men Only',, has been discontinued by mutual consent after the Robin was lost. And Robin No. 3 has had to be started over this year, having completely vanished into the blue. This does happen to Robins occasionally, and when it does, I am left wondering where these forlorn birds are perching, for they must be somewhere.

It is sad to report the death last year of Anne O'Callaghan, Surrey, England, a member of International R. Robin No. 2. Though it is late, we extend sincerest sympathy to Mr. D. A. O'Callaghan, whose note in the Robin, in part, said, "she was so keen on her garden, especially her iris and cactus, and the Robins she joined over the past year gave her tremendous pleasure. Extend your Robins—they do so much good."

I am pleased to have Mrs. Ethel B. Karr as Director of the Winter Hardy Cactus R. Robin No. 1. My grateful thanks and best wishes go to her. I could use a director and several members more for the No. 2 Winter Hardy Cactus Robin which is being formed. All other Robins have almost complete memberships at present, but if any of you would like to belong to the new Robins, such as Mammillaria, Euphorbia, City Dweller's, International, or any other Robin you are especially interested in, won't you write me and I'll see if a group could be started. If there is enough interest new Robins can always be formed. May I suggest that those who wish to join our Robins mention whether they are members of our Cactus and Succulent Society. I have had a number of inquiries seeking membership and not aware that our Robins are for those within our Society. I would be most happy to place those who have written me as soon as they are members of our Society, making them eligible for these Robins.

The following new members have joined our Robins: Miss Dorothy Baudissin, St. Louis, Missouri; Mrs. M. H. Duarte, Massachusetts; Mr. D. R. Dewar, Basingstoke, England; Mr. John Daily, Indianapolis, Indiana; Mr. C. L. Chance, Austin, Texas.

The news from the Robins is fine, as usual, and much more good material to write about than there is space to do so. From International Robin No. 2, Nancy Duck, of Colorado, speaks of Pediocactus simpsonii. "It is our mountain cactus and found at an altitude of 6,000 to 10,000 feet, and is a pin cushion type with pretty pink flowers sometimes verging to white or yellow. We find very small plants in flower as well as larger ones—some as much as 22 inches in circumference. The higher the altitude, the larger the plant. I found three cristate plants of this." Norma Lee Cole teaches school in California where her third grade "cherubs" are inclined toward a love of cacti as "we study desert plants," she says. Lucky youngsters, to begin so early their appreciation of these plants.

In R. Robin No. 9, Nona B. Mott, in Arizona, enclosed a picture of a new cactus called "Pilocanthus paradinii, the first new cactus discovered in Arizona in thirty years. The hair-like spines are soft—the plant 4 inches in diameter. A rare plant." Of Robin letters she says, "They are just like cactus collections—the more you look, the more you find. I read the Robin several times." For those who like Tiger Jaws she gives this information about her six varieties of Faucaria, "I find F. militaris flowers more than the others, with F. tigrina and lupina next, but acutipetala practically refuses to ever bloom. Grows well though."

From Robin No. 6, Billie Marie Anderson, in Texas, describes one of her plants and part of her collection. "I have a plant I am especially proud of, Euphorbia lactea, marbled Euphorbia or Milk Tree. Started from a six inch, rooted cut, bought for 19 cents and sent me as an exchange plant in 1950. Now a good 4 or 4½ foot tall, well branched. Her big cacti, growing nearly to the ceiling, are grouped together. Hairy plants, knobby Totem Poles, Devil's Clubs, and other cacti. "Careful though, there is a huge black spider and a small one—on thread—a vampire bat. Look close and you'll find green snake and copperhead and birds too. Snakes and spiders are rubber but look real." Beverly Minson, in Oregon, contributes, "My greenhouse is heated by a small electric heater with a thermostat, and costs about a dollar a month to run during ordinary winters." "This hint might come in handy," wrote Irma Huch, in Illinois. "This is one fellow's advice, with seedlings to prove it. Use sterilized sand and soil an inch deep in large mouth, flat, pint jars. He scatters the seed on top, waters them, replaces the metal tops in which he has punched two or three small holes for ventilation, and stacks them several high in a sunny window and forgets them. The evaporation is slight, so no watering is needed until seedlings are well established."

The Decorator's Robin is quite different from the other Robins. Members were using succulent material for decorative arrangements in this round, and one such group, made by Alta Tarango, in California, included "dark blue Mexican glass, a candle to match, some silver beads, some glittery material, and some pretty, red Echeverias." Corsages were mentioned made with small, green, succulent roses with multigreen ribbon, which sounds attractive. This Robin must be fun!

From International Robin No. 1, and from New Zealand, Joyce Hillmer explains how she treats her Echinocereus, that she may not lose it from rot in the winter. "My Echinocereus are kept dry throughout the winter, and become very shriveled looking, taking on a purplish color. They live on the top shelf of my greenhouse and receive lots of sun. In the growing season they are given plenty of water." Our minister from England, the Rev. Mr. Gamston, Len to us, has brought a smile with his own style of shorthand, and we share his rue over the loss of a large Anacampseros filamentosa when he wrote "that trinity of evil has again won a viktry—kindness, worter and frost."

From the Winter Hardy Cactus Robin No. 1, on its first round, every member has some hardy plants of cacti, although Edith Bestard seems to sum up the general impression with "I used to think the Opuntia, 'Prickly Pear' as it is generally known, was the only hardy one, until I contacted persons in Idaho, Oregon, Nebraska, etc. who sent me globular types. Then when I got Ethel's and Nancy's lists, my eyes were really opened. I think the plants most of us would like to keep in our hardy beds are those like Sclerocacti, Pediocacti, Utahias and various Echinocerei. These can stand teriffically low temperatures, though not all the Echinocerei can, of course. The trouble is in this region and in the East and Northeast the cold is accompanied by much dampness, which is not true in the high mountain regions where these cacti are natives." Another member, John Daily, living in Indiana, says, "I have been cultivating cacti for several years, without outstanding success and always a bit envious of those with greater facilities, particularly greenhouses for winter storage. The varous Cactus Journal articles pertaining to hardy cactus began to arounse my interest in this phase of cactus culture. An ad caused me to order every species avainable, except Opuntias." The special bed he made along the south side of his house has given excellent results even with an average rainfall of 40 inches. He also gave this interesting "before and after" story of

his plants which he wintered in a low ceilinged attic, without much light but where temperatures could be controlled somewhat. Here, for the better part of the year, his cacti spent their lives under unfavorable circumstances. Many failed to bloom at all. "This last summer," he said, "I cut a hole in the roof 4 feet by 8 feet in which a quarter inch thick plastic was framed. Now I have a dry greenhouse with remarkable results so far. Among others three species of Ariocarpus bloomed—A. kotschoubeyanus, macdowellii, and fissuratus."

On that happy note we take leave of the Robins until another time, except to say the best way to get the most out of a Robin is to join one.

Happy flying to all.

(MRS.) GLADYS H. PANIS
P. O. Box 705, Falmouth, Massachusetts

SPINE CHATS

LADISLAUS CUTAK

G. W. Reynolds travelled over 3,000 miles in Eritrea and Ethiopia during the early part of 1956 investigating the Aloes of those two countries. He states that no less than 30 species are found there. Six new species were discovered on the trip and these he describes in the January 1957 "Journal of South African Botany." They include the following: *adigratana, sinana, berhana, monticola, harlana,* and *pubescens.*

Aloe adigratana has longer, thicker stems, longer leaves, longer denser more conical racemes and much larger but less clavate flowers than *A. camperi* to which it is allied. *A. sinana* also seems to be nearest to *A. camperi* in general habit of growth, leaves, and clavate flowers, but differs in having a less branched inflorescence and longer flowers. *A. berhana* is nearest to *A. percrassa* but is a slightly smaller plant with little or no stem, and subcapitate racemes with curved-cylindric flowers. *A. monticola* is a most attractive and distinctive species characterized by having large olive-green somewhat glossy leaves with prominent horny brown margins, and paler grown teeth that are longest at the middle of the leaf. It is closest to *A. elegans. A. harlana* appears to be nearest allied to *A. monticola* but differs in having slightly smaller bracts, shorter flowers, and especially in cylindric-acuminate racemes. *A. pubescens* is characterized by having cylindric-acuminate racemes and pubescent flowers.

* * *

In the same issue Reynolds also describes a new Aloe from Mozambique which he named *Aloe decurva.* It was found in large numbers in shallow pockets of soil on semi-denuded granite slopes along the top of Zembe Mountain. The new species is distinguished from all other known species by having a somewhat sulcate curved peduncle bearing a short densely flowered "bottle-brush" like raceme that is always deflexed or decurved.

* * *

At one time the highly productive land in Australia was overrun with prickly pear (Opuntia) and brigalow tree or scrub *(Acacia harpophylla).* The prickly pear was introduced into Australia as an ornamental in 1840. From a single plant it spread rapidly until the early 1900's, when it covered some 50-60 million acres, making the land practically unproductive. Much of the growth was 6 to 10 feet high and so dense that it could not be penetrated by a man on horseback. Fortunately control was found with the introduction of the Cactoblastis wasp which marked the beginning of the end of prickly pear as a serious pest. However, clearing the land of the brigalow tree required more than an insect. Australia is now faced with the need to increase agricultural output because of industry and population, hence these overrun areas have to be reclaimed. To learn more of the problems confronted see James H. Boulware's article in Foreign Agriculture for March 1957.

* * *

There is an interesting article on the Otomi Indians of Mexico in the March 1957 issue of "Natural History" under the title, "People of the Maguey" by W. J. Granberg and Maurilio Munoz. The Otomies number around 65,000 and virtually all of them live in hovels of sticks, stones, and cactus in the state of Hidalgo. Their huts, thatched with dried maguey leaves and walls of organ pipe cactus *(Lemaireocereus marginatus),* can be seen within hailing distance of the Pan-American Highway. You will often see, as I have on numerous trips to Mexico, the Otomies trudging along the highway with a mass of whitish fiber over the shoulder and twirling a long slim wooden spindle on which ixtle is spinned. This whitish fiber and the thatched roof of the Otomies also come from the maguey which provides them with food, clothing and shelter. Water is very precious in Otomi-land, for Mozquital Valley where most of the Indians live, is a forlorn land. Fortunately the Otomi needs little water for cooking, washing, etc. Instead of water, there is agua-miel, the clear, tasty liquid yielded by the maguey. It sours within a day or two, but before this calamity can occur, the "honey water" is converted into pulque. This beverage is "water" as well as food for everyone from babies, who know no milk from cows or goats, to the aged. Agua-miel or pulque supplies all the proteins, vitamins, and minerals necessary for survival. And just as important, it quenches thirst. The maguey (agave) supplies more bulky foods than pulque alone. Scrapings from the bowl in which the agua-miel collects are taken home to be either eaten raw or roasted. In the large, thick, sharp-pointed leaves are worms, which are roasted and counted as a delicacy. The skin of the leaves serves as a dressing for wounds, and the sharp thorn at the tip, threaded by nature with a strong fiber, serves as a stout needle. The blossoms of the maguey are eaten roasted and have a honey-like flavor. The tender parts of the 20-ft. stalk are also eaten, while the tough sections are fed to pigs.

* * *

Because I had written up a paragraph in "Spine Chats" about the Yucca Moth that feeds on the Joshua Tree, I further wish to report that actually the California subspecies which was unnamed has now been described as *Megathymus yuccae martini.* This information is gleaned from Bulletin of the Southern California Academy of Sciences, 55: 150-152, Sept.-Dec. 1956.

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1957 CATALOG—JOHNSON CACTUS GARDENS

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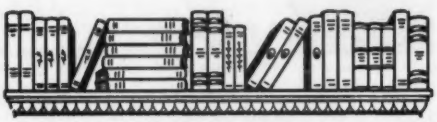

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